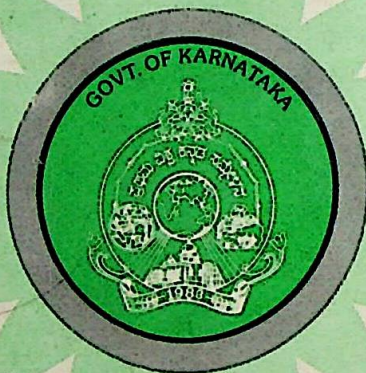


*A Study on the
Methodological Contributions
of Haridasarus of Karnataka*



R. BHARADWAJ



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**A STUDY OF THE METHODOLOGICAL
CONTRIBUTIONS OF THE
HARIDASARUS OF KARNATAKA**

**By
PROFESSOR RANGANATH BHARADWAJ**



**VISWA KANNADA SAMMELANA
14/3 A, Nrupathunga Road
BANGALORE-560 002**

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R. GUNDU RAO
Chief Minister



VIDHANA SOUDHA
BANGALORE.
DATE : 18. 9. 1982

THE RESOLVE AND THE REALISATION

Karnataka's historical heritage is more than two thousand years old. During this period, the history of this land has been glorified by the profuse and rich growth of its language, literature, art and culture.

The essential spirit of a land is hidden in its cultural foundation. In order that this foundation is strong enough, and that the cultural heritage rises to prosperity and that great heights are achieved, endless efforts should be carried on.

Though interwoven with the Indian culture, Kannada has got its own inherent qualities as well as culture.

In order to depict the glorified heritage of Karnataka, against the current developments and in order to proclaim it to the world at large, the first world Kannada Sammelan is being organised at Mysore, which is one of the dominant cultural centres of Karnataka. This, I believe, is a historical event. In order that this Sammelan becomes a grand success,

and that its sweet memory will remain with us for a long time; many schemes have been taken up. One of these has been to bring out cheap editions of the celebrated works of great writers in Karnataka. Under this scheme, we are publishing one hundred and two works and seventeen anthologies. In this literary series, apart from poetry, novels, dramas and thought-provoking books, anthologies which reveal the spirit and variety in Kannada have also been included. At the same time, to introduce the fragrance of Kannada writing to non-Kannada people, we have been publishing the English translations of some selected works as well. We feel that our efforts will not go in vain, if sympathetic readers would read and enjoy these works. At the same time, we will have the feeling that the purpose of holding this Sammelana, would have been fulfilled.

The expert members of the literary committee have taken great pains in selecting these works. Luckily, there has been no dearth of great works in Kannada. In this background, the difficulty of choosing only a definite number of works, can be well understood. Even then, I believe, the literary committee has done this task in a manner appreciable to all. It is my duty to thank this committee. The writers who have obliged to publish their works under this scheme, have accredited themselves. I have to remember with gratitude the liberal help they have rendered on this occasion.

(v)

If this series of books will find good response in the hearts of Kannadigas our resolve will have been realised. I can proudly say that this effort is without a precedent. I humbly pray to mother Bhuvaneshwari that She brings all good to us, by blessing us in this particular endeavour.

ಶ್ರೀ . ನಂಜುನಾಥ

Chief Minister.

ABOUT THE AUTHOR

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A METHODOLOGIST OF WIDE REPUTATION,
PROFESSOR BHARADWAJ IS ACCLAIMED FOR
HIS AUTHORITATIVE AND INSIGHTFUL
RESEARCHES INTO THE HARIDASA LITERATURE
AND HAS BEEN BESTOWED, IN RECOGNITION
OF THIS, THE TITLE OF
Scientist – Philosopher.

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PREFACE

Modern Educational System is under unprecedented attack. Its relevance stands widely questioned. A number of superficial remedies have been suggested, but of no avail. The root cause for the crisis is much deeper. It is concerned essentially with the philosophy, the view of reality, underlying the content of our education.

I encountered this problem in the course of my professional work and found that the framework of thinking adopted was of a highly stylized nature which viewed reality in terms of imaginary constructs. These constructs are often logically self-contradictory, defy a clear specification and are thus empirically irrelevant. I, therefore, ventured on developing alternative methodologies for investigating the being and becoming of phenomena.

In the course of my enquiry, I found clues to a possible alternative paradigm in

the works of the Haridasarus of Karnataka. I, therefore, took to a serious study of this vast literature and have made over the past several years, extensive researches into it. Last year, when I was approached to put together my findings in respect of the methodological contributions of the Haridasarus, in the form of a book, I readily agreed hoping that I could easily put together the copious notes I had made in this regard in a book form. But, as I began working on the book, I found the task to be somewhat difficult as the book was addressed to laymen. I, therefore, began refashioning it, avoiding, as far as possible, technicalities. Even this was difficult since the subject-matter is basically highly scientific. However, I have tried to take a *via media* position and have presented the main results in the form of a small booklet as a preliminary to a forthcoming work on the same subject. I also see some advantages in this procedure, since I may have the benefit of scholarly criticism on this effort enabling me to take account of it in the forthcoming detailed study on the subject-matter.

(xiii)

I wish to place on record my sense of gratitude to Shri K. Jayacharya, Director, Department of Kannada and Culture, Government of Karnataka, for giving me the opportunity of placing this book before the scholarly gathering at the World Kannada Conference, 1982, at Mysore.

RANGANATH BHARADWAJ

July 2, 1982

Bhagavata Ashada Ekadashi

Bombay



THE THEME

This monograph elucidates the methodological contributions of the Haridasarus of Karnataka in terms of modern approaches to the philosophy of science. Our central purpose is to present the basic building blocks of the analytical framework employed by them to investigate phenomenon – its being and becoming. We shall not be alluding however to the theological implications of their works. After a detailed investigation into the operational significance of the conceptual scaffolding, as extracted from the Haridasa literature, their method will be transformed in terms of the concepts of modern mathematics. Such a transformation, it is argued, would not only aid towards a clearer perception of the methodological contributions of the Haridasarus but also help applications to resolve problems of both scientific and societal significance.

CHAPTER I

INTRODUCTION

a. The Purpose

The object of this study is to help understand the methodological underlay, implicit in the works of the Haridasarus of Karnataka. The Haridasa movement, dating back to beginnings, nearly eight centuries ago, continues to survive and fascinate scholars till today. By a process of systematic analysis of the thought-content in their works, we directly propose to pursue, in the endeavour of laying bare a framework for facts, which, when transformed in terms of modern conceptualisation, would help understand the being and becoming of the phenomenon. Critical scholarship in the history of Indian philosophy has already placed the panorama of Haridasarus on the map of Indian theological contributions of great worth. Inasmuch as their contribution to this area is far from being belittled or discounted, we shall not allude directly to them in this work. The reason for such a deliberate delimitation is to let the hard core of their scientific methodology, which forms the base of their philosophy, project boldly without getting garbled or becoming nebulous, when surrounded by an aura of religious mystique. However, in so far as some philosophical

concepts are constructed on the building blocks relevant for our modern mathematical frame, we would not hesitate to refer to their works directly.

In the process of such a study, a possible danger would be one of distortion if we were to go back historically with the present point of time as the fulcrum. However, since the focus is on the process in reverse, we would not be searching for anticipation of successive writers in their predecessors but, in fact, study the problems and solutions as transformations by the method they used. The intention is not to mislead the reader by attributing more than what the Haridasarus intended in their works; but only to suggest and establish that each was not just a chronological precursor to the other in the body of thought; but was consciously contributing towards a simpler formulation of the same theory so as to enlighten further generations. Indeed, the possibilities of our current search for a framework and a universal methodology lie in the consistent nature of the writings of successive Haridasarus with simplifying transformations. The stream of thought and the mechanism of transformation varied from one Haridasa to another, given the basic core of relations. Thus, every successor or, from a reverse view-point, predecessor, articulated ideas which were significant not only in the context of his own works but also to subsequent works further up or down in the chain, as these ideas were integral to a given system of thought and were not mere footnotes, idle speculation or even alternative points of

view. Though the basic characteristic in all their works was theistic and it would appear as though they made only a passing reference to the every day affairs of nature and man yet it is not to be understood that they did not realise the significance of the being and becoming of phenomena as a means to unravel the more non-materialist mysteries of the universe. An important point which can bear emphasis in this regard is that the second clue to a methodological underlay lies in the fact that the main tenets of successive Haridasarus did not contradict even remotely the body of thought of their predecessors. In fact, even small changes were within the perspective of the total literature, and each progressive work was conducive to a proper understanding of the previous philosopher. In this sense, they could be called scientists whose energies were directed more towards discussing the causation behind cosmic phenomena through an enriching medium of systematic concepts and poetic analogies. Their arguments have been developed with such cogency that it is impossible to resist their intellectual force as different from the sway of emotions superficially or generally attributed to them.

Carried away by our desire to be circumspect so as not to make exaggerated claims regarding their works, we should simultaneously avoid the pitfall of understatement and unacknowledgement of their real worth and beauty. Their works are gracefully, even entrancingly, composed pieces of profound wisdom on a vast variety of topics. They appealed, broadly

speaking, to two types of readers : those interested in simple descriptions and those intellectuals who might wish to think deeply about what they read. The complete candour in their works, free from doubts, hesitations or fears, may seem too simplistic to the present-day modern intellectuals who are often steeped in cryptic and ironic writing. Their works form an impressive and fascinating array wherein every *significant ingredient* necessary for a consistent body of thought was incorporated. As there is no concealment in what they wish to express, there is no difficulty either in interpretation or in seeing fully the directions of thought. In it can be seen the height of intellectual prowess as they saw farther and bolder, approaching the underlying similarity of structures between different phenomena both in terms of variety and uniformity.

Another feature of the Haridasa literature which we shall invoke upon frequently is that they dealt, albeit from a theological perspective, massively with natural history embracing everything from plants and animals to mineralogy and astronomy with the intention of systematic classification, exposing them as system builders. What we would be endeavouring in this work is to rearrange the significant concepts they have used in terms of building blocks so as to see more fully the direction of their thought into a holistic theory which does not spring from theological premises as conditions. Each relation would be seen as resulting into a harmonious combination of structures

through the principle of equivalence; the function of each part in perfect correlation with the function of others. By transforming their hypothesis into entirely scientific terms, those requiring scientific endorsement for their religious convictions could reapply the framework culled from their works to resolve what today seems to be an anachronism between science and religion. Though the aim of this monograph is not to demonstrate the concordance between science and religion, the works of the Haridasarus, which are deeply philosophical, can be transformed to reveal the primarily scientific attitude that they possessed. This would naturally lead to a unique methodological discipline which is both incisive and definitive. A general theory can therefore be convincingly proven to be sustained in their works which, rather than channelise discussion in straight-jacketed forms, appreciates and respects the disaggregative nature of reality. Such a conclusion would stand irrespective of falling back upon the theistic belief that creation was rationally ordered and intelligible. The process of cosmic evolution would then assume a unique and linear form. The Debate that is therefore ignited is whether or not a secular version of the world is acceptable. Some would feel that the intrinsic limits to scientific knowledge render spurious the unsubstantiated doctrines, and it would be far better to acknowledge the creator, rather than risk being irreverent, as we have no conception of creative power. This study therefore does not straddle the controversy between religion and science.

So far we have focussed our attention on features of the Haridasa literature which provide clues to the existence of a basic methodological framework. This is not a biased reading into their works, but must be seen as the scientific results derived by a discerning critical mind. It results in a mechanism sophisticated enough to appeal to the most intellectual as well as least tormenting to the conservative. The most distinctive feature of this mechanism is that it is a unique discipline comprising a set of rules which can respond to any area of investigation. It is therefore not an obvious and deliberate overstatement or plausibility but a refinement of a progressive creationist. Even at the level of the popular accounts of scholars of their works, they are both engaging and stimulating. Deep study unravels a decisive structure of definite ordering which is intuitive, thus including any irregularity as preordained rather than as a random and tortuous affair, thereby drawing a distinction between explanation of appearances and reality. These considerations strengthen the congruence between a theological frame which they preached and the reality seen in the balance of nature which a conceptual specifiable framework would yield.

b. The Scope

The seminal influence which the Haridasa literature had on the cultural tradition of Karnataka was due to the form of conception, the originality and the impact-making presentation. The structure gains further

intellectual respectability and elevates it from the mere emotional or devotional connotation it has had so far. The details and ramifications of their vast achievement are so intricate and complex that we cannot possibly do them justice in a brief monograph. If this work has served to raise more questions in the mind of the reader than with which he started, this work will have served its purpose. We therefore select a cross-section of problems which would give insight into the development of their work, point out the strong points which have led to their phenomenal success. In other words, this is not a comprehensive work; it only serves to raise a few crucial issues by changing the angle of approach.

While we make a passing reference to the vast literature of all the numerous Haridasas we refer in particular — to avoid problems of reference in an English work to a Kannada text — very copiously to Shri Jagannatha Dasaru's more popular work of 'Harikathamritasara'. The mainspring of this book is therefore the many-patterned variations that their imaginative work has towards solving the more difficult problems underlying the philosophy of science. Their expository devices ranged from using metaphors, analogies sometimes for a heuristic, illustrative purpose and sometimes with a scientific function to suggest the hypothesis they proposed. Thus the scientific method embodied in their works can be constructed so as to explain the unfamiliar by the familiar. We shall only make a passing reference to their lifestyle and its effect on

their work rather than invoke the miracles attributed to them or the disenchantment they felt or the attempts upon their life that were foiled, etc. We shall examine even their philosophy from a scientific angle and study their expositions from the direct merits it bestows on the method. In spite of their popularity with the general public, the work was of a refined, subtle nature and was on a more elevated plane than mere religious sentiment of an angry cleric. The different responses their work has given rise to can be reconciled in theology and has never been the object of hostile caricature. Indeed, one might say that, as far as modern man is concerned, despite the universally religious approval of their works, their successful dissemination is due to several features : the scientific pedigree, the explanatory power, the application to man himself and the easy assimilation, irrespective of divergent social, political and philosophical ideologies. In fact, no other ulterior purpose can be invoked other than desire to communicate with as large a mass of humanity as possible, intertemporally.

With this structure of their work in mind, we could proceed to enumerate the approach of our work to study the development of their scientific theory. The reading of their works is relevant to man's search for a method to study the variegated phenomena, analyse the problems associated with such a frame, state the main lines of evidence which have convinced us that such building blocks exist in their work after exposing the garb, construct the conceptual scaffolding

and consider how phenomena can be explained better by this than by any other theory, from a scientific and philosophical sense. When we see that there is no conflict between this and the popular religious sentiment, we have a theory which not only purports to show the perfect compatibility between the philosophy of science and the science of philosophy but also is successfully associated with popular social and moral ideology. We have strenuously attempted not to overplay the image of the Haridasarus but to contemplate the advantages of using such a frame and compare them with the disadvantages if ignored. This book provides a more seriously accurate picture than has been so far done in other works where they are a classic case of mystic whose subsequent achievements have been shown to have far outstripped their work as scholars.

It is quite impossible to capture in a few pages, the exhilaration, the social spirit, the awe and the changing vistas that remain deeply impressed on the reader's mind. It is one of history's curious ironies that the sublimity of their works has been mistaken for a burning zeal of devotion when nothing can exceed the scientific orthodoxy of their intentions or works. The Haridas's profession may be regarded as a useless one by the ignorant, but a man of enlarged vision would look upon their way of life as affording an opportunity of seeing men and things from a focus which few can perceive. When seen thus with the privilege of hindsight, we could extend the study of each Haridas's life by

speculating about the way in which different experiences in their lives might have influenced their works. Some of their works, while reflecting on the pleasures and pains of living, reveal the facets of life so grippingly that they create a deep impression by stripping the veneer off civilised man and laying bare his hypocrisy.

c. The Approach

The remarkable point about phenomenon is that it can be so diverse, yet so analogous on points, raising an expected question, striking wonder in the thinker as to why there is so much identical treatment to different forms or different treatment to identical forms. The ingeniousness of order leads to a conclusion that there is *rhyme* and *reason* in the universe. Thus, without oversimplifying the logic, we must undoubtedly take the facts as 'given' as the starting point. The Haridasarus were not worried as to whether they were noting the right facts, for every fact was interesting and relevant and proceeded to devise a theory which would explain the collected facts. As they acknowledged themselves, they did not disregard the works of their preceptors but proceeded to further describe, classify and study, providing explanations and propagating the theory. Critical annotations or excerpts are not provided in this text, but references are given as well as some analogies explained. They were continuously amazed and expressed it forcefully without ambiguity while referring to the coils and toils man preoccupied himself with, when it clearly showed a

futile melancholy and reinforced their work by strong prescriptive power. Though they had an isolated lifestyle, their insight into the diversity of phenomenon led them to have a sound and sanguine outlook. Their confidence and intentions were not reined in as they recognised that any one accepting their entire theoretical framework would find it consistent and therefore sensible as there was no factual evidence which was not also theory-based. When the theory is accepted in toto we could also show that no plausible alternative hypothesis exists which fit all the facts.

In our review of their work we must refer to the different roles which analogy plays in their works—sometimes it is a rhetorical device, or it serves an illustrative purpose; occasionally it helps serve an explanatory role and, sometimes, has a constitutive role. The advantages of using analogy are many; to show methodically and in a deliberate manner a visual appreciation of a concept, so that even the most ignorant would find the analogy not superficial but powerful. The analogy as a tool was therefore a felicitous choice, there was no scope for misunderstanding since the language enshrining it did not create any difficulty, as, when taken literally or metaphorically, the methodicity was directly related to the goal of communication. Their 'method' is therefore one long argument crossing over several generations. each of whom, once converted to this mode of thought, embarked upon a systematic attempt to further transform and simplify, for purposes of communication.

aspect of the universe gave them the insight they required, into the general principle in nature which would allow the existence of many varieties giving rise to successive variations which conformed at each further layer a pattern. There was therefore nothing anti-religious in their work even when they talked of secular phenomenon, as they visualised direct connective links. This was not just a convenient device but a basic analytical tool, opening up new fields of enquiry in all directions. A more thorough and detailed exposition would have to follow this investigation, to develop each point in turn. But this work is sufficient to achieve its goal of investigating their method and indicating the optimistic strand in their works which made their theory palatable to social and political pioneers looking for a message of hope. Our approach to their works provides a rigorous scientific sanction and dispels any further obstacles that may lie for the disbelieving. They were scrupulously honest in their works and came to terms with the then existing period. Having a brilliant encyclopaedic knowledge, they always produced a salient example from nature to illustrate their point. They considered the existence of many structures in a definitive sense to record the linear path of investigation towards truth. They were thus scientists of repute in whom an oversight is yet to be detected. Presupposing and establishing a common proportion in the multitudinous variety, their conjectures attained a status of originality. Every ingredient was a further grist to the philosopher's mill which was neither bedevilled by confusion nor doubt. Since

their theory was one which applied to all times, having a logical structure in their argument, they talked in terms of certainties and not probabilities.

While conservative scholars are just impressed by their rhetoric, we shall proceed to give a more systematic account of their work so that it is also instructive. The logical scaffolding therefore transformed their work from being mere speculation into universal convictions without defiling the sacred ground of religious serenity. Their theory can be proved absolutely in terms of the laws of reasoning using mathematical investigative tools in force today so as to explain phenomena properly in relation to a recognized cause. Only when a necessary relation is established between phenomenon and cause can it be said to have been explained. The essence of their framework consists in inferring antecedent conditions and anticipating future evolutions from phenomena which have actually come under observation. Thereby they do not risk having made any undemonstrable hypothesis which automatically reduces to a mere speculation and provide a proper causal explanation. By suggesting the primary of final causes, the truth is established through a series of logical building blocks eliminating any circularity in argument. This coherent and natural explanation was of great merit in terming them as positivist philosophers and was therefore not a threat to cherished traditional beliefs. Their scientific enterprise when translated empirically provides the necessary relations between phenomena.

Philosophers of science will recognise their explanation as scientifically respectable as the logical status of their theory could be corroborated in a total measure in an ingeniously modern frame to explain the intermediate missing links between theory and fact so that there can emerge a framework for facts.

The enormous flood of literature of the Haridasarus renders us grateful to them for the stimulus they have given to research in the area of their scientific contribution in a methodological sense. However we must guard ourselves against pitfalls of three types : prejudice, definition and misreading. When opinions are strongly divided on any subject regarding its relative merits, there is bound to be prejudice for or against it. The work of the scientist is not to defend any faith, religious or scientific but to uncover the concepts crystallised in religious and cultural values so as to see how far they were influenced by scientific pursuits. Secondly, few entities in history fall into neat prescribed categories, hence we have to take care in using the terms the Haridasarus used for our purpose ; as definitions will influence the factual basis of our framework and its conclusions. The definitions should be neither too narrow to be useful nor too vague to be worthless. The Haridasarus are a phenomenon in the philosophical history of Karnataka, having a unique and national character. They became a separate current and a heritage by virtue of the development from teacher to pupil. There is no confusion in the term

Haridasa, as they were totally identified by the Madhwa doctrine they preached. They became dominant during the reign of Krishna Devaraya of the Kingdom of Vijayanagar. Though other philosophers had certain common points of theology with the Haridasas, they were distinctive as strong and uncompromising protagonists of the Madhwa philosophy. The most distinctive characteristic of the Haridasa was his consistency in following both in his preachings as well as in practice, the tenets of the Dwaita system. Events in the lives of some Haridasas may mislead students to think of them as defiant to orthodoxy and ritual. But they must be seen as their protest against the social barrier of caste and creed which exposes even more strongly the logically orthodox framework of thinking they adopted. By the time the Haridasa movement had strengthened in the early beginnings of the 18th century, the situation was complicated as there were Haridasas from various sects who strongly stressed the inner life and self-realisation and therefore were scorned by the apparently literate but really ignorant Sanskrit pundits of the time. Small wonder then that they even derided their works just because it was not in the sacred Sanskrit language but in Prakrit Kannada. The problem of defining the Haridasa gains in complexity when we see that they were puritanical in thought but latitudinarian in their belief in social rites. We must therefore be extremely careful about the pitfall of inadequate definition.

The subtlety and depth of the next pitfall of misreading an author to have said what he has not said or even denied is even more alarming. The Haridasarus clearly described how religious ethics influence the life-styles and how economic and social conditions have, in turn, an influence on religious ethics thereby entangling cause and effect. Exactly similar problems of misreading exist when we try to "read into" their classical works, suggestions about modern science like hints to building an aeroplane or correlating the Bramhastra to the atomic bomb! Yet it cannot be denied that the spirit of modern science and the spirit of the Haridasarus are congenial, inasmuch as both draw from terse logic. Religion does not disfavour any sanction to scientific rigour in thinking. This is specially hard to believe for those who are confronted by the inner-worldly asceticism which suggests-wrongly-to them an antithesis to science.

The approach is to begin with precise facts which are true by definition. They lead to axioms which are simple, though abstract. The further deductions would therefore be true, though they are abstract consequences of these definitions. By combining these concepts in different ways, we could draw up several relations, and these recombined would lead to structures. This is the scientific method which, though apparently seems as if we have not derived anything that has not been put there by ourselves, is really a frame extracted by us by this device. The principle of equivalence is a method in which the final consequence is true only because it

is identical with what precedes it, as this, in turn, is true with what precedes it and so on upto the initial axiom. Hence these *identities of ideas* when based on facts would also be real, instead of being arbitrary and relative. The conclusion or final consequence would be a deduction which is related to all the intermediary logical steps and data becoming a true proposition. Thus would emerge the framework for facts. In this sense, inasmuch as it is related to hard facts, it is different from the mathematical reasoning wherein the mathematical definitions are no longer absolute truths but relative to the definitions arbitrarily selected; and invented by the human mind. As a contrast, physical facts are not based on suppositions, and the frequent observation of a sequence of natural events gives a basis for conclusions which are definite. This approach in the monograph therefore relies on the observation of facts and the use of scientific reasoning. In fact, a framework not resting on such secure foundations but dealing with nebulous probabilities or impossible assumptions would not be suitable to study the precise and clear works of the Haridasarus.

It must be reasserted that, while the Haridasarus followed reason and would not tolerate obscurantism or paradoxes, the moral content of their works was not mere conveniences or stipulations but practices consequent upon the adoration of God. Thus, the western fear that a reasonable approach to life would be pernicious and cause injury to the belief in God is not sustained in their works. The faithful never had

any cause for alarm as the Haridasarus, while differentiating from the body of knowledge and scientific method, always campaigned for 'bhakti' or devotion as a companion to the 'grave' knowledge attained. Thus it was that, while they were absorbed in the truth of truths that is God, they were not swamped by the science they cultivated, as they rose from one truth to the next till they reached the eternal, immutable and invariable source of all-truth.

What is further important is that the successive Haridasarus in their later works show no essential change in direction. Though they were all talking of an extremely old world, their theory of the formation of the earth and planets, or the extent of geological time, the succeeding epochs in the existence of the earth were plotted so as to point to similar milestones and vividly conveyed the long span of time in an identical manner between scholars. It is therefore not common to find veiled assertions, dangerous hypotheses, heretical phrases, retractions or double meanings in their works, so that the work of the historian is not the difficult task of reconciling inconsistencies or "reading into" their works as was common in the contemporary contributions in the west. In fact, this work does not try explicitly to include or to exclude the role of God while explaining natural phenomena. Indeed there is no such controversy here, as that is not the task we have addressed ourselves to. We would attempt at understanding the sagacity of the Haridasarus in terms of the framework that they used

to understand natural phenomena by the principle of equivalence, and, in fact, to show that such a framework not only fits facts better as it is based on them, but also that it is better than other tools used hitherto.

The seventeenth century attitude of Boyle and Newton who studied natural philosophy as a route to God was different from the eighteenth century development in France where God was excluded from natural philosophy. The wholly materialistic view however was opposed by orthodox christians and Voltaire the deist. Materialistic science faced a dramatic struggle with the established faith leading to the modern antithesis between science and religion. As a contrast, the Haridasarus were, in fact, open-minded, enquiring and having a scientific approach. They persevered in the face of fresh problems, were very methodically organised in their thought as well as their daily modes of living and worked for a fair dealing for workers, minorities and the downtrodden. They were concerned about their spiritual and physical welfare, and the general social climate of the time was such that the humanitarian element in their movement continued to thrive. Though they were ascetic and had no personal financial means, food for big congregations was not unheard of as they depended on social doles. They were known for their exacting characteristics, such as emphasis on hard work, truth and personal integrity, objectivity and fairness, belief in human reason and high moral quality. Their religious ethic did not spur

science and technology in the East, as Quakerism did in the west, but then the two orientations were entirely different.

Historians dealing with the history of the Haridasarus would probably attempt at reviving the imagination, the individual experiences, the feelings and the thoughts of the past so as to make the past live again in their poetry and artistry. However, so as to be effective, such a reenactment must be coupled with a critical analysis of their motives and actions and a scientific approach to their arguments, also consideration of analogies and relation between the then existing facts and the present. From the point of view of the scope of this work, we are only dealing with their methodology exclusively. This analysis is therefore independent of past events or events during their lifetime. Moreover, the "personality" of the Haridasarus is determined by their own individual endeavours. Nevertheless, it is possible to trace regularities and a certain degree of similarity in the spiritual and physical conditions of several Haridasarus leading to an understanding of the 'constancy' in the "Haridasa" character.

The scientific understanding of historical contribution is not so much sophisticated technique as the use of a proper analytical frame, for unbiased understanding. Many norms can be used to evaluate the contributions of the Haridasarus. But it must be pointed out that theirs was a non-normative analysis

where they talked of the here and the now, rather than 'optimal' conditions in the sense of the attempts of economic theorists. A large number of scholars researching these works are not aware of the mathematical concepts and go only by the value-premises of devotion and emotion. The mathematical grandeur of their model is brought forth to the forefront in chapter three of this work. In spite of defining their concepts clearly and building their framework upon them, their rigour has not been exposed so far by others. The problems of ambiguity and deliberate concealment do not arise in the case of the works of the Haridasarus. However, it is true that varying usage of terms based on different philosophical premises by others, other than the Haridasarus, may have resulted in confusion due to vague allusions which we shall steer clear of in our work. We adopt an axiomatic approach which attempts to bring out the implicit valuation in the concepts to a general level of acceptability. By using the current mathematical standardisation of concepts and of methodology, we can avoid mistakes due to individual bias or taxonomy so that objectivity of analysis is ensured. Every set of phenomena can be interpreted differently. But no single indicator is sufficient to crystallise all the aspects of a phenomenon. Concepts help us to assimilate the web of several interrelated activities when all the aspects associated with them are viewed under a common fabric.

d. The Chapter Scheme

After this introductory chapter where we have discussed the aim of the book, its scope and approach, we deal, in chapter two, with the stylistic characteristics of the Haridasa Movement by initially giving a brief history. While discussing their style, we develop it under three headings of the language they used, their mode of presentation and their contributions. The last is again subdivided into sections on their contributions to Literature, Art, Philosophy and Social Movement. This is followed by certain contextual remarks on the tradition of the Haridasarus and our own present context.

In the next chapter, the core of this work, we attempt a modern reformulation of the Haridasa method. After enunciating the basic postulates of the Haridasarus, we discuss the necessary and sufficient condition for specification, the nature of facts and specifiability. The operational meaning of the above discussion is then considered by deriving propositions about relation and relating them to structures. After providing a one-to-one transformation of the basic postulates in terms of modern mathematics, we discuss its need and usefulness and evolve what we call the vectorial view.

This vectorial view is studied further in terms of changing phenomena, and illustrations are drawn from several fields such as Statistics, Mathematics, Social

Sciences, Physical Sciences, Environment and Aesthetics. While exhorting the need for further research, the fourth and concluding chapter lays bare the causes of waste of research effort and outlines further opportunities for analytical and empirical exploration.

e. Conclusion

To summarise, we stress that the arguments of the Haridasarus were steeped in originality and emphasised their authority in science which was not ludicrous or gratuitous as can be seen from the widespread reputation among the general public. The mechanism proposed is therefore neither deficient nor the product of an unscientific mind; it could be seen closely related to theism, or as secular as the most secular geometric theorems. By setting up the wide angle lens in this way, we avoid any image of warfare between science and religious orthodoxy. They were crystally clear in their exposition and did not introduce aimless rhetoric into a sphere in which they were ignorant. The psychological block to a full understanding of the theory is thus removed when comprehension at the rational level is called for to understand the distribution of abundant variation in nature. When individual imagination is consciously channelised into visuals which are specifiable, we can get out of an utterly hopeless muddle. Further research deepens the impression of the magnitude and universality of the far-reaching law of interdependence. "For a time in the life history of every higher animal, the direct,

personal, gratuitous, unrewarded help of another creature is a condition of existence"¹.

1 Drummond Henry, The Ascent of Man, London 1904 Edition pp.16-23.

CHAPTER II

THE HARIDASA MOVEMENT STYLISTIC CHARACTERISTICS

a. A Brief History

The Haridasa Movement has always been popular in Karnataka and each of the individual dasarus is deeply respected. The only way to appreciate this feature of an essentially intellectual movement is by delving deep into its history. It is strikingly curious that the Haridasarus of Karnataka have not only not depreciated in importance over these centuries but that they were also properly appreciated even during their own lifetime. However, their concepts and ideas are becoming gradually clearer today as very efficient mathematical tools, and terse logical axioms are acceptable to an even larger section of people. In order to study and understand their enterprise, we must go into their chronological antecedents, their preceptors and even their lifestyles. Their tradition continues today, evolving into simpler transformations. Viewed thus, the present work is a progressive step towards a secure future, working for the good of each being. Scientific progress is achieved by making new discoveries through new perspectives - looking at the well-known phenomenon from a different angle.

In the case of the Haridasarus, such a methodological perspective does not raise any radical questions regarding the relationship of science and religion. A methodology is naturally discipline-free in the sense of subjects only it has its own internal rigid code so that it need not be an enemy of divinity, thereby scotching the false view that philosophical scientists have necessarily to be irreligious.

We do not write the history of the Haridasarus from a merely literal point of view, but it is undertaken as a research into their work to unearth the methodology and not as a propaganda for the present. The approach is scientific in the sense of any well-researched work, as also of trying to discover immutable laws of generalisation about the physical order and human nature. Classical studies of their history are well developed, but there are no scientific studies as we know the subject today. The Haridasarus are respected as one of the most influential set of philosophers that Karnataka has ever produced whose works even in their own days were widely acclaimed.

We shall see, later on, that, when their work is not seen as an isolated unit, but rather as part of an intellectual totality, then there is no logical necessity to devalue the divine origin of the world. However, it may be hard to accept, for those whose deepest convictions are affected, not merely at the external level of phenomena but the very nature of belief itself.

It is useful to consider how the Haridasa Movement was affected by some of the deeply incisive historical events of Karnataka. Though the term Haridasa was alive in a functional sense ever since Shri Madhwacharya, and there were many men having similar leanings in thoughts, the term gained coinage during the sixteenth century. Even some renowned ascetics who have renounced the world have contributed to the literature and are included in classics which deal with the lives of the Haridasarus. Many of them also had the misfortune of being hounded by the conservative and orthodox pundits of those days.

One of the most influential figures of the time was Shri Purandaradasaru, a faithful follower of Madhwa. He was eager that useful knowledge should be available to the common people in their own language and dedicated his life to making this a reality. The pundits thought this unwise and against the honour of religion as practised by them, to set out so much knowledge, which was, until then, their exclusive preserve. The Haridasarus set the precedent of writing weighty matters in the colloquial form of Kannada so as not to hinder those ignorant of sanskrit from knowing what according to the Haridasarus they should have known for proper living. During the process of its movement, the Haridasa cult developed certain distinctive features. The difference between them and the pundits was not a matter so much of theological doctrine, as that of what the latter thought consisted in "true religion" namely,

practices, beliefs and institutions which had come to stay conventionally and had been supported by those who knew Sanskrit. The Haridasarus wanted to remodel man's way of life on what they believed to be the express teaching of the scriptures. Their more conservative opponents - the Sanskrit scholars were more inclined to maintain tradition in relatively unimportant matters, such as ceremonies, and prescribed prayers and rituals as opposed to free prayers and preaching to all. Whereas one emphasised good expository preaching, the other necessarily called for a regular and educated hierarchy of scholars.

The Haridasarus were not sectarians and, quite often, without breaking away from conventional doctrine, shifted their activity to a new and more fundamental form of reaching each household so that they were maintained by the day-to-day doles of the laity. A fair evaluation of their roles lies in the fact that they "appealed to the heart" of the masses, whereas the scholars conducting family worships at home by the head of each family, gave more importance to circumstances and ceremonies.

This throws an interesting light on why the Haridasa movement rapidly developed social overtones. A moral ethos spread wherein doing good for their brethren was as important as shedding off hypocritical masks oneself. At the domestic level, they found themselves defending the rights and privileges of the downtrodden people against the brahminical high

priests. The ordinary man, therefore, without being deeply religious himself, could develop a rapport with the Haridasarus for social reasons. In many cases, the practical aim of reaching the mass was supported by a strong theoretical doctrine and they never failed to point out that their writings were for the benefit of mankind. They emphasised that they wrote in the vernacular for the unlearned. They were the 'chosen people' for whom spreading 'the glory of God' for the 'benefit of mankind' was the special role and they fulfilled that role.

It was not uncommon among these Haridasarus to assist in the education of the lay men by translating scholarly sanskrit works into the vernacular or by transforming them into simpler frames or yet by writing treatises to expound various social and practical problems.

b. Their Style

The literary output of the Haridasarus has been enormous: Plays, Poems, Biographies and Essays, all popularising philosophical thought; Anti-authoritarianism empiricism, experimentation, useful applications, emphasis on moral quality of life as defining a superior being, and above all, a unity between theory and practice were sparkingly characteristic features in their works. They not only showed a humanitarian interest in subjects ranging from the growth of the foetus to botany and astronomy, but also were active in

perpetuating a scientific basis for theological works. In this sense, 'rational theology' became a characteristic of their works so much so that the conservative view of the west, which looked upon natural science as a danger to religious orthodoxy, never arose in the case of the Haridasarus. They were advocates of tolerance and were sober and generous with their knowledge without bearing the taint of fanaticism. Their spiritual frenzy did not prevent them from being conversant with the subtlety of things and the deep skill in nature. They therefore desired the construction of their works to be in a more universally appealing language free from mere confusion of meanings and words. Thus we find that the problem of the relationship between the Haridasarus and science is immensely interesting and complicated, revealing a kinship between science and religion. The research now launched upon proposes fully to establish this scientific spirit, proceeding from a position of rational enquiry and useful empiricism. Their works provided the impetus to discover the intelligible order which is revealed through such an enquiry, so that reason would be a vehicle to curb natural desires and to take up activities calling for rigorous reasoning, with the larger purpose of social welfare. This work particularly refers to the close association between the Haridasa movement and scientific enquiry showing how the two have the same congenial and mutually supportive set of values. They served as a critique of traditional learning and stressed the empirical methodology thus becoming "radical

empiricists". They were involved in mathematical and astronomical investigations which substantiate the existence of links between their movement and scientific enquiry. The conceptualisation however was subject-free and purely intellectual so as to be able to establish a precise causal relationship. To obtain a clear understanding of the different applications of their methodology is the end of our research effort, so that no amount of emotional hysteria can invalidate their attitude to scientific enquiry. The process is to isolate the basic approach inherent in their works so that an intellectual movement linked to their 'internalist' scientific thinking emerges. The continuity of this scientific thought is seen in the works of all the Haridasarus without exception. By a deeper survey into a wide range of primary sources, we gain a clarity into the definitions of terms being used, and how they are used consistently by all of those belonging to the Haridasa cult. They were therefore religiously motivated for the study of nature and, as an obverse of the problem, scientifically justified the following of their religion.

When we keep continuously harping on scientific progress, it should not be mistaken for a spectacular technological advance or 'economic gain, but a more profound transformation wherein the moral ethos derived from philosophy is, in turn, connected with a rational scientific spectrum. The habits of correct reasoning, the precise ideas formed by their methods and the means of recognising or proving the truth

developed the framework of thought which overcomes the tyranny associated with the dark forces of religious fanaticism. Modern scholarship as perceived in the western scene has increasingly diverse and complicated influences leading to areas too abstract even to be visualised or specified clearly. When such is the case, the resulting confusion is not due to any confrontation between religion and science, but between correct science and incorrect science. While becoming bolder in developing thought, it is common to leave the shores of meaningfulness into dimensions which are confusing by their sheer nonlinearities and unspecifiabilities. This orientation, coupled with new schemes for educational reform, new attitudes to law and attempts to establish an emancipated society leads to a feeling of rootlessness. Such an atmosphere must be banished from our mental screens forthwith so as to save further wasteful mental effort.

Spinoza, a philosopher of the Seventeenth century, thought that it required rare intellectual gifts, an ability to deal with a long chain of reasoning and caution in making judgements to persuade a reasonable approach to God. He, however, felt that the greatest good lay in the intellectual knowledge of God, and the greatest happiness lay in man's love of a God who was rationally understood and not simply feared¹.

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1. Scientific Progress and Religious Dissent, The Open University Units, 6 - 8.

"All the Jumblings of Atoms, all the chances you can suppose for it could no more bring the Parts of the Universe into their present order, nor continue them in the same, nor cause the Organisation of a Flower or a Fly, than you can imagine that, by tumbling together the letters of a Printer a million times, they should ever fall at last into such a Position as to make Aeneid of Virgil or Iliad of Homer or any other Book in the world. And, as for the infinity of Matter, it only excludes, what all reasonable and good men must exclude, an extended and corporeal God, but not a pure Spirit or immaterial Being." ² Toland relied on the argument of design to prove the existence of God. Boyle said that matter could not move on its own and hence God alone could be the source of motion. Such arguments which were theistic but were stripping the scriptures of revelations and miracles, by leaving a body of doctrines, supposedly entirely based on reason, angered the Western Christian Church and these thinkers would not accept them. To Voltaire, Newton's philosophy was appealing, as it led to the knowledge of a Supreme Being who has created everything and arranged everything freely. Descartes, on the other hand, was strongly criticised for leading men away from God, as his exclusive concern was with the physical world of matter and motion. Voltaire alleged that Descartes' belief elevated the status of matter to

2. John Toland, Letters to Serena, London, 1704.

something of independent and necessary existence leading to atheistic materialism like Epicurean atomism. Voltaire felt that the faculty of sensation in animals and the intelligence in man could never have come from chance combinations of atoms. The atheist's problems of the existence of evil in a world designed by a benevolent deity did not bother the Haridasarus, as it was a part of the total plan of creation where there was a hierarchy of 'gunas'. The western controversy of the seventeenth and eighteenth century was thus skirted around by not taking up the vantage points of either deism, atheism or theism.

At the same time, the Haridasarus did not advocate a blind belief in God by confessing ignorance of matter, its formation, nature of the soul, etc. For they knew that a belief unsubstantiated by reason would not have stability properties beyond the torments and pains of a transient nature. Further, Voltaire's³ rejection of the Epicurean account of the origin of universe as a chance result of colliding atoms was also based on the question as to why then were there not new species of living organisms generated spontaneously all the time. The Haridasarus therefore adopted a theory which connected the phenomena of generation with God. Their theory was of a pre-existent set of entities which, during the process of creation, was released into the stream of life so that there was no room for chance or

3. Voltaire : Dictionnaire Philosophique, 1764.

spontaneous generation in this account of divine design for living form. The teaching of Bayle⁴ proposed, that any dogma, including one on scriptural authority, was false if it conflicted with reason, while Voltaire supportively, acclaimed the typical deist who appealed to man's reason and condemned superstition. At the same time he said that, while atheism is to be dreaded religious fanaticism was to be dreaded a thousand times more.⁵ The former used reason and could live a happy life whereas, the religious fanatics carried away by the caprices of their imagination and the excesses of passion led to calamities and bloodshed. In no sense of the term can the Haridasarus be called fanatics, though religious they definitely were. The idea in this work is not to make religious texts appear consistent with their own views, nor to introduce a supernatural causation but to remark on the extreme originality and balance of their framework which is logically consistent and empirically meaningful.

Holback attributed the errors of religion to the mind's straying from the path of reason and truth into the dark world of imagination. Alarm or ignorance of natural causes had led men to invent genni and gods. Was it an act of adoration, and reverence

4. Pierre Bayle '1647 - 1706 who discussed theological controversial ideas in the form of a dictionary'.

5. Voltaire: "The fewer superstitions, the less fanaticism, and the less fanaticism, the fewer calamities".

to bring in god each time our ignorance or laziness prevented our understanding Nature. ? ⁶

However, de Maillet ⁷ reinvoked the Epicurean idea of eternally existing and externally moving matter, and concurred with what the Indian told the missionary about a developing universe as opposed to the idea of a static one; though the conclusion of Telliamed's fantastic content was quite different from that of the Haridassar as it reinforced the elimination of God from nature.

In his natural philosophy, Newton had searched for signs of God's design in the universe. The movement of planets in the same directions and plane at particular velocities indicated an intelligent plan for an ordered cosmos. Buffon replaced a comet for the divine arm and said that a planet had collided with the sun, hence these characteristics of the planet. ⁸ He followed Maillet, however, in concluding that the earth had been formed by the slow action of natural causes agreeing that the earth had been covered by the sea, the flux and reflux of which had produced mountains, valley and the relics of internal marine organisms.

6. Baron d 'Holback, System de la Nature 1770.

7. Benoit de Maillet : Telliamed, or conversation between an Indian Philosopher and a French Missionary, on the Diminution of the Sea, the Formation of the Earth and the origin of Man, 1748.

8. Georges Leclerc, Comte de Buffon (1707-88) Historie Naturelle, 1749.

The covering oceans had receded, but rains, rivers, winds, frosts, earthquakes had continued to influence the surface of the earth. Such a view does not deter the existence of a divine hand, if we recall that matter cannot move on its own.

In fact, the very shape of the universe is different, according to the Indian scriptures. It is therefore useless to proceed in this direction, as we have set out to write a methodological essay and not draw preliminary conclusions, on the basis of restricted knowledge, partial observation or even an irregular perception of the universe.

i Presentation

There is an interrelationship between learner, task and the instructional method used by the teacher. The methods of presentation of matter wherein the classical rote learning is involved with strict control on time is a reception task where the learner has no control over the arrangement of matter and so is passive. When he is left to peruse material at leisure, he evolves his own criterion of learning and, then, his is a selection task where the learner is active. Instead of the passive learning Paradigm adopted by the behaviourist school of cognitive psychology, Gestalt's problemsolving tradition is to be favoured where the learner is a live participant in the active learning paradigm.

Our approach in this book too departs from the rote learning method and proceeds through an active process, wherein general impressions of the characteristics and limiting features are formed initially, and, then, one concentrates on an in-depth strategy which is adopted to understand the basic concepts and the rules of logic governing them. Thus, instead of getting overwhelmed by the threatening bulk of the research materials thrown up by the contribution of the Haridasarus, they are handled through a process of learning which emphasise the exchange of information and interaction between the text and the recipient. Taking into account the latter's limitations and preferences in the learning strategy, this book helps to correlate and process their work through a simpler strategy, dictated by the need to communicate to a larger mass conversant with a different vocabulary. An "internal representation" as is called in psychology, or what we call a transformation, is thus involved in presenting their contributions in terms of complex symbolic structures as a unified framework or strategy to solve the problem of modern research.

An important feature of their model is that each one, with the help of just a few components, enlarges the extent and diversity of the applications, thereby helping to solve interesting theorems. The rules are so structured that there is no chance of conflict among them and hence are logically consistent. Such a scheme lends itself nicely not only to solving the direct goals which they were meant for, but it can

also be used explicitly to express newer models with the help of the capitalised power underlying the original frame.

A frequently heard complaint about religious writings is that they represent truths which are either too abstruse or too trivial and hence cannot become sound common sense; they become highly suspect in their use to the understanding of daily life events. The irrelevance to the real world, however, is not a sufficient justification to conclude that the ethical and moral investigations are a waste of time. Here, there is also a paradox, in that, what is irrelevant socially is also sometimes accused of being a dangerous opium to keep the public under their power of myths. What we have set out to demonstrate however, is that the biases and distortions generally attributed to spiritual works, however much successful in hoodwinking in other contexts, at least in the case of the Haridasarus, have not transmitted falsehoods. The framework is capable of transcending such errors, provided one views their work freely as has been attempted here. Indeed, if anything can be affirmed, it is that such a rational view would support the initiation of a stricter code of ethics and values at an individual level, while being socially conscious of the need for detailed attention to the types of research that is funded, so as to make knowledge a unique social responsibility for the common good. The intellectual tradition of the west recommends the

development of a more educated public, but the ultimate analysis would lead to the promotion of greater self-control as an alternative to control by others. Viewing the conclusions of this book from a radical perspective, political and economical structures have to be transformed in keeping with the view of reality propounded in this book, so that the research traditions are influenced and a truly sophisticated understanding is achieved by the social scientist, who can then become a useful tool in shaping social perspectives by debunking all the useless flattering myths with which he is now surrounded. The Haridasarus did not use the psychological practices of persuasion and coercion to alert their contemporary society, nor was their contribution just an accidental influence; it was a purposeful deliberate and systematic effort so as to induce spontaneous changes in the social routine in the people's lives through the generation of didactic, ethical and emotional arguments. In such a process, the distinction between individual and society need not be drawn for purposes of the ethical issues, as the effects of their mass communication as an interaction between the social problems can be considered as having yielded perennial positive results. The impetus to change the individual having sprung from humanitarian impulses, the effort was initiated in the full knowledge - and a socially acceptable process of education, not coercion - leading to the model of a man and society so as to form the underpinning of future social research with a sound methodological and empirical foundation. The theoretical anchorage

in their contributions is restructured to suit the types of research that modern day investigations focus upon, and the thought-reform is highlighted which was their therapeutic aim. The evangelistic fervour of the Haridasarus and their inner enthusiasm as had a reformatory effect on social thought through emotive power beyond the range and scope of their own temporal and spatial boundaries. The therapy's success lies in the fact of the shift in emphasis from the personally emotional level to an intellectual level. They had more impact during their own life time, as there was no dissonance or inconsistency between their own individual self-concept and their external behaviour.

It is generally believed that the functions of religious organisations are several: providing tension release and thereby physical and spiritual welfare; acting as a cultural bridge to achieve group solidarity; providing a means to achieve individual goals; propagating a set of beliefs about the cosmic reality and pointing out the role of humans. From this standpoint, it is not at all an exaggeration to say that the subjectmatter and the manner of its presentation in the works of the Haridasarus served as a social adhesive and continue to do so even to date.

ii. A. Contributions: Literature and Art

Tracing back the origins of Indian music to Shrangadeva of the 13th century, Shri Krishtacharya⁹

9. See, Kinnari Vidwan, Shri Hulguru Krishtacharya : Karnatak Music and The Dasakuta, Kannada Research Institute, Dharwar, 1951

has definitely dispelled the myth that Karnatak music was only that which sprung from the south, especially the soils of Mysore and Madras. He gave a Pan-Indian vision to the music which included both Hindustani and Karnatic styles, by introducing a revolution in terms of vocabulary as well as propositions different from the then prevailing Bharata's view of music. During the first half of the sixteenth century, Shri Purandaradasaru not only increased the range of the musical ragas but also introduced new forms as well as an extremely popular and prolific quantum of compositions. Since the Dasakuta of Karnataka utilised the musical framework and grammar so extensively to propagate their teachings, Karnatic music became a well-founded and profound musical tradition.

Literature and music are companions wherein the latter's growth is fostered by the former, the form or language becomes very important specially if it also has the purpose to cater to the common run of people. The Haridasarus of Karnataka bear the total credit of having used an extremely easy form of the Kannada language as the base of literature for music. Indeed, scholars claim that Kannada is the most distinguished language which has the privilege of having the most accommodating and sweet, conformable text amenable to the needs of music. The Haridasarus of Karnataka have therefore enabled the multidirectional, simple and artistic growth of the Kannada language.

The Haridasarus in their musical compositions—the first Kannada composition to be set to music is

that of Shri Narahari Thirtha during the thirteenth century, and continues as a tradition till today – had two aims : one was a personal aim of self-realisation, and the other was that of reaching the masses for a social purpose. The vastness of their approach derived from their drawing on the teachings of the Vedas, Shastras, Puranas, Mahabharata, Poetry, Alankara, Moral Precepts and Metaphysics in a simple form. Those able to perceive the deeper meanings reaching upto cosmic causation could study each syllable with great profit. Scholars intending to study intensively have as yet been unable to exhaust the potential of the works of the Haridasarus.

The first goal of “Naadopasana” enabled the Haridasarus to relate their literary works to music. Indeed, the musical forms served the purpose of a bridge between their personal goals, also as a social purpose inasmuch as music is an easy method of appealing to the people. Thus, Shri Narahari Thirtha, inspired by his teacher Shri Madhvacharya, composed poetic forms in simple Kannada. For the subsequent century and a half, we are unable to procure the history and works of the then existing Dasarus. During the mid-fifteenth century, Shri Shripadarayaru enabled the Kannada compositions to resume their growth which gained strength during the sixteenth century. The literature of this century is the most popular, and it is the prevalent form even today. Karnatak music too reached its zenith during this period. Shri Vyasarayaru, Shri Vadirajaru, Purandaradasaru and Kanakadasaru,

created extraordinary musical compositions. Further, works on the grammar of music and the principles of aesthetics too were formulated during this era.

One could wonder on the magnitudinal relationships between the literary forms and their development into musical compositions. A well-defined Raga and Tala pattern alone would popularise and sustain the lyrical text. The harmonious combination of these two would lead to the tunes. When the entire process is accomplished in a diction of a simplistic style, the literary and musical forms would become popular and thus become a tradition, by constituting part of the culture of the people. Thus it is that the Karnataka Haridasa contribution to music and literature, though so ancient, continues to be so modern and indeed so persistent in the memories of the people as compared to modern ditties.

It is not an exaggeration to say that the Kannada language too has benefited by their works by fully flowering in all directions of literary form – as prose, as poetry or as *lalitha sangeetha sahitya* – better than any other language, including *sanskrit*. Another feature is the social purpose that was contained in the *sahitya* or lyrical text. Those which were brief but slightly difficult in style called the “*ugabhogas*” were perhaps meant to be sung in various melodies so as to please the singer and help him into the trance-like state of meditation, whereas the longer texts, ranging from three to several hundred stanzas, were

meant to educate the people in various aspects from the moral point of view as well as in worldly wisdom.

The traditions of music and lyrical form were comprehensively popularised and flourished during the mid-sixteenth century. Dasa sahitya took a special and wider form when Shri Purandaradasaru was, according to his students, credited with having composed 4,75,000 compositions, of which many are "ugabhogas". Today's tradition does not give much popular attention to the "ugabhogas", which is a special feature and must be added to revitalise the singing repertoire, and enrich Karnatak music. Indeed, the Haridasa tradition departed from the Prabandha type of compositions and popularised the "ugabhoga". The "ugabhoga" compositions are mainly based on the melodious variations of a slower pace based on Margi and Desi talas. However, the other main form of Haridasa literature, which is the "Suladi," emphasises laya tala thus forming the third important aspect of Karnatic music. Shripadarayaru, during the second half of the fifteenth century, composed what later came to be known as the "Suladi" which defined a framework of seven talas plus Adi tala and concluded with a 'charana'. This was different from the lyrical conventions in vogue till then. The speeds of the various stanzas would be different and just as the dancer's originality would depend on the various combinations the feet would perform to, the lyricist's creativity is seen here in the variations, the artistry and the uniqueness in which he combines the syllables to the set frame. In "suladis" the tunes and

the swaras are next in importance to the layatala, the important feature being that the subsequent speeds as a relation to the first speed adopted, *i.e.*, the accelerator, was not a proportional double or a quadruple, but could assume variations in a different ratio of 3-5-7-9 instead of the earlier 1-2-4-8-16. Thus, the secret of the composition lay in the exquisite ability of the Haridasarus who developed intricate calculations and wrote the lyrics to match the rigid frame so as to match the syllables with the main aim of communicating the philosophical text. In this way, there arose two types of literature – a skill of composition which added to the treasures of literature, and a mathematical framework which added to the musical grammar and method. Because, of this no doubt, the “suladi” becomes a form of musical composition and literature unique to the Kannada language and to Karnatic music; it is not found anywhere else. An extraordinary amount of research is called for to categorise the various “suladis” and change the method of singing to the traditional norms of lakshya and lakshana so that laya – tala – musical instrument and dance can all be integrated. It is said that, as of now, for lack of tradition and ignorance by drawling or clipping off syllables, merely a meaningless stream of sound is produced. Unless the “Suladis” are sung in the prescribed manner and backed by thorough research, the vista of Karnatic music can only be said to be half unravelled.

The next form of Haridasa literature is the ‘kirtana’ or ‘padas’. This is a vast collection and

since they were composed with a social purpose, scholars can approach the text from different angles. Looking at it from a musical point of view, we find that the ragas and talas are selected harmoniously by using simple rules which the ordinary man could understand and put into practice. As a result we have musical pieces which could be useful, comprehensible and sung as easily by the cowherd as by a Pundit, young and old, cultured and uncultured and men as well as women. A new method was thus established wherein preaching to the masses was accomplished simultaneously with the popularising of music. The Pada is a form which is simple, having a "Pallavi", "Anupallavi" and several stanzas called "Nudis". Other composers of the south have maintained this simpler pattern – as a standard form in their compositions – than the "ugabhoga" or "suladi". The singing of the Padas became popular as not much of knowledge of the Ragas or yet severe practice was called for in the sense of a formal musical training. It is supposed that though there were sixty to seventy ragas or melodies prevalent then in music, the Dasarus used extremely simple, popular, and pleasantly entertaining tunes of about thirty or thirty five of these ragas to sing their compositions. It was therefore possible to sing numerous compositions if one knew the basic melody of just one lyric. This explains why literature and music grew and flourished in Karnataka as an integral part of one another. It is a rooted tradition wherein any cultured person even without formal training can sing these Padas without much

injustice to the raga and to the tala. Further, as the lyrics were related to the everyday events of life, which are universal like bathing a baby, or putting him to sleep or eating, the Haridasarus conveyed their philosophical meanings in the content of a lullaby or a song while giving an oil bath or yet songs for a joyous occasion or those while eating, chewing betel-nuts with the same intensity as those devotional songs used for worship, for social gatherings, and while working hard, travelling, begging or hawking. The main secret of the popularity of these padas is that the tunes are such that they can be sung on various occasions and are enchanting and haunting. These padas can also be performed as dance pieces. The Haridasas, though living in the midst of people, were dependent on themselves for their musical accompaniments and had their own system for keeping the beat, the scale, while also dancing to the tune.

The Haridasarus also popularised the 'chapa' tala, and enabled compositions to be sung in varied ragas and talas depending upon the ability of the singer. Of those composed to preach and of the poetic forms, we have many by Shri Purandaradasaru, Kanakadasaru, Shri Vadiraja Swamigalu as well as Shri Jagannathadasaru (vide his Harikathaamrithasara).

The compositions of the Haridasarus dealt with philosophy, praise to the Lord, Upadesa or teaching, Anvbhaua or experience and Charitrika pieces. The types of compositions related to these subjects are :

- 1 Padagalu
- 2 Suladi
- 3 Ugabhoga
- 4 Vrittanama-Vrittaprabandha
- 5 Ragale : folk form
- 6 Shatpadigalu - Bhamini, Vardhaka, Shara
- 7 Tripadi another folk form
- 8 Sangatya
- 9 Suvvali - Sung mostly by women - specially compositions of Jagannathadasaru.
- 10 Gundakriya : Composed by Sri Vadhiraajathirtha
- 11 Dandaka : by Sripadarajaru, rarely used otherwise.
- 12 Other miscellaneous forms : Shobane, Suvvi, Urutani, Kolupada, Lavani, Lullaby and other folk forms. Some "ugabhogas" are also in the Vachana style.

The compositions also throw light on the then existing life styles, the caste marks, the ornaments, the type of dress, the temple decorations, the games played by the youngsters of the day, the medicines used, the idioms of the day, the customs and socio-economic conditions of the people, the currencies used, the marriage practices, and other aspects of their lives.

ii. B. Philosophy and Social Movement :

Religion could be broadly defined as all that is of the highest good, or narrowly as mere belief in God. What would be more realistic is to see it functionally

and to identify its role as one of vesting the day-to-day real and meaningful small world-routine with overarching structures of meaning that pattern and integrate beliefs. For the individual, religion gives him an identity and a set of moral rules by which to evaluate behaviour. In the larger context, religion tries to explain the nature of man, his origins, the ultimate destiny it shapes, the social structure by analysing altering patterns of relationships in a social context. Religion can act as an integrative mechanism, is a social controlling force and organise and legitimate distribution of power; also as a channel of social mobility or as a means of accepting harsh penury sublimely. The double motivation of self-interest linked to a broader perception of society is powerful though not problem-free, specially involving as it does, generalising from the particulars.

Man is a technological animal and he can consciously alter, through technology, his physical environment and biological make-up. But it does not mean that all that he is capable of doing does come to pass for the betterment of society. The new powers having contradictory aims, can be misused. The new ideas and culture do affect the day-to-day lives of man and the destinies of nations. To know the potentialities, the intellectual foundations, as well as the effects of a technocratic culture, both must be examined thoroughly. An extreme theological view is to see the technological embrace and progress as a breach with nature and, therefore, as a withdrawal

from God wherein the system of ideas, techniques and machines puts man in terms of power where God is or used to be, by asserting himself as the ultimate reality. But the universe is simultaneously physical and spiritual, and it is not a new exercise to try to find a common explanation fitting both these aspects. Technological man should derive ethical norms, reformed institutional structures, have an ecological perspective and coordinate the progress in terms of natural resource exploitation. Investigation into any phenomena involves mapping and charting of the area, whether it is done in colours, verbals or numerically. Such a work has to bridge the direct, expressive domain of the arts and the abstract realm of science calling for artistic creativity and a stern discipline of thought, scholarship and logic, to explain and explore the meanings of human experience.

Philosophy is neither a physical science nor a behavioural science. It cuts across all areas of science. Initially, there was no substantive distinction between philosophy and science. The former was a search for wisdom with certain self-evident truths as starting points, to which empirical observations were incorporated, and led to a definite logically true conclusion, whereas science is seen as a systematised body of information. The former is a process, the latter a produce¹⁰. Aristotle gave a different orientation to the

10. H. W. Burns and C. J. Branner : Philosophy of Education, Essays and Commentaries, Ronald Press Company, New York, 1962.

distinction between philosophy and science. Enquiries could be initiated on principles which were self-evident, or empirical observations could guide investigation. The latter was taken up as scientific method-hypothetico-deductive process. By this process, it appeared as though philosophy held reasoning to be more important than facts, while science held facts to be more important than reasoning. The philosophical method of the Haridasarus departs from this axis entirely, by checking the philosophical method with the empirical facts - Hence there is no divorce between Philosophy and Science.

Contribution of Haridasarus to the Principle of Creation¹¹

The technological innovations and the scientific discoveries of the west have still not been able, as we have seen earlier - to negate the existence of a more superior strength than what the scholars and experts can visualise.

They acknowledge that, in spite of the current quantum jumps of a technocratic society, it does not enable them to *create* even inanimate bodies. Creation, preservation (through rains and care) and destruction, are not subservient to man. Even a small seed sprouts only when it is preserved in the quinary structure of earth, water, sun, air and a container or space thus consisting of five things. The methodology in the

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11. Shri Vijayadasaru: Srishti Prakarana Suladigalu
Varadendra Haridasa Sahitya Mandali, Lingasuguru,
1957. See the foreword by Hanumantha Gorebala.

scriptures is based on this principle and delineates theories about animates in the form of Biology, Zoology, Entomology and Botany. So also, theories about inanimates such as physics, chemistry, physiology, geography, astronomy, chronology, psychology, archaeology, sound, gravitation motion, logic and analogy are to be found in the scriptures. For want of a proper methodology to understand these, people have derided them to look elsewhere for consistent theories. The Haridasarus of Karnataka have transformed the teachings of the scriptures – Vedas, Upanishads, Bharata, Pancharatra, Puranas, Brahmasutra and commentaries on these in sanskrit – into Kannada and created a universal literature of a very high order. We must rise above those contemptible and ignorant who are unaware of the contributions of Haridasarus and deprecate them.

1 Veda – The Dasarus converted this into “Ugabhogas” and “Suladis” in terms of the Pada, Krama, Ghana, Jata, Swara, Udatha, Anudatha, Sarga, Upacharya, Bindu, Nada, Ghosha, Shanta and Atishanta.

2 The meaning and purport of the Bharata is present in many of the works of the Haridasarus.

3 The Dasasahitya has the old Kannada, Mediaeval Kannada and modern Kannada usage in variegated combination.

4 Since the Dasasahitya has the propositions with a stronger scientific basis, it is better than other literature.

5 The Dasasahitya has, apart from this, folk literature, artistry of words, a communicable style of

language, Vangmaya, Chandassu, Rhyme and Rhythm, and forms of poetry, prose and drama.

6 The literature is also conducive to the growth of music by its being able to be set to music.

7 The musicology and dance in their literature is in keeping with the oldest traditions.

8. Use of rhythmic instruments and other aesthetic values are evident in their works.

9. The secret of their language, the idioms and the riddles were all related to the *Samadhi darshana style* they used.

10. They prescribed and propagated a moral ethic which tried to reconcile inter-religious differences, reform language, reform society and relations between men and women generally.

11. They evoked devotion in the creator and moved people emotionally.

12. Among the Haridasarus, Shri Vijaya Dasaru has composed an ordered set of "Suladis" about the process of creation. Wherever necessary, we shall try to correlate what these "suladis" say about geology or geography with the scientific thought of modern times.

As has been stated earlier, the religion-science nexus enabled those interested in theism also to proceed on the path of scientific or factual enquiry. By factual world, we mean all the animate and inanimate aspects of creation. There is no reason for an inanimate object to have any expectations, but the

animated have various types of desires. Looked at from every point of view, their desire can be summed up as that they would prefer comfort and would not like sorrow or difficulties. But man among the animates, specially, finds that, even if he were to attempt his best, he cannot always avoid sorrow, nor always attain happiness. Why is this so? Many have not thought of it. But man has the power to reason. If he does not reason out and is content to be steeped in a mere Epicurean indulgence of his sense organs, he is no better than an animal. Hence it is that, if we think methodically, we reach the conclusion that we are in a position where we cannot achieve all that we desire. What, then, is the reason for not getting what we have worked for, but, at the same time, getting what we have not desired or indeed purposely tried to avoid? Who is the cause? This is what we must investigate. It is insane to presume that there is no cause for such an occurrence. Is that cause animate or inanimate? Is it perfect or imperfect like man? Is it free or bound? What is its strength? What is its mode and process of operation? How are we related to such a cause? Is it useful for us to know it? If so, how should we go about to understand it?

How are we to attain it? Is it useful to us if we attain it? Is there no danger in such a process? Is there any loss or danger in not trying to reach or understand it? These and other useful questions form the basis of factual enquiry. Theists or scientific philisophers have these problems dearest to their heart.

These questions cannot be answered by just electronic means of travel or communication. They are beyond the microscope or yet the telescope. They can be understood only by delving deeply into our scientific method of enquiry embedded in the scriptures and their simpler transformations and works of the Haridasarus. Since the scriptures are encased in a language which is beyond the pale of the common man, the Haridasarus have thought deeply and well prognosticated this condition. Hence they have transformed into the Prakrit, the Vernacular of their day, these methods of scientific enquiry. A dialogue in sanskrit which is based on the presumption of a certain level of intellectual accomplishment and knowledge of language is useless to an ordinary man who is not aware of the basic issues. Hence, instead of confounding further the precepts in terms of mere literary adornment, the Haridasarus have used a '*Samadhi Bhasha*' which is quickly grasped and which goes to the heart of the matter straight away. It is not divested of depth, yet it is sweet and positive in style, so that the being and becoming of phenomena are investigated in simple scientific terms. Who are these Haridasarus? They are Shri Purandaradasaru, Shri Vijayadasaru and their followers. Shri Shripadarajaru, Shri Vyasarayaru, Shri Vadirajaru are among those who, without expecting anything in return, worked hard to communicate for the benefit of mankind. While expounding their philosophical method, they made use of the instrument of music to enable those interested in the process

of enquiry to enable the mind to concentrate in its task, and have used a simple form of Kannada. They have identified God as the sole reason and lord of creation, who is perfect, complete, independent and omnipotent. Our relationship to Him is one of servant to Lord, and should be one of devotion. Since He is the lord of the scriptures, only by love and devotion will it be understood. Once He is attained, there is nothing else to aspire for. If He is not attained then anything else is useless.

The Haridasarus have composed three types of Prabandhas :

- 1 Suladi
- 2 Ugabhoga
- 3 Pada

Among the Lord's functions, creation is the starting point, wherein a hierarchy is established – an ordered array of 'gunas' – hence the Haridasarus tried to elucidate this process in terms of "Suladis". The Lord's manifestation in different forms 'itself is creation. It is an admirable task to encompass this process in their works. Creation consists in allowing the animates to reach a special status in the rule of God and allowing the animates to perform in their own respective spheres.

The works of Shri Purandaradasaru are not mere lyrics of devotional praise of the Lord. He has transformed even the Upanishads into Kannada. Thousands

of compositions relate to an ethical fabric. Even the Bhagavad Gita is written into simpler forms which can be sung while working, or as lullabies. The Raichur district of Karnataka State is the source of such abundant compositions of the Haridasarus; even the folk songs consist of their compositions. More effort into research and compilation of their works is essential. Haridasarus of Karnataka ended their compositions with a line which identified their pen-names with the Panduranga Vithal of Pandharpur, whereas other saints in India have usually ended their compositions with their own names.¹² Secondly, even when we go by sheer numbers, Karnataka has produced many more saints than other parts India.

After the Buddhist and Jain periods in Indian history, the Guptas appeared on the scene as the upholders of the Vedic culture. In course of time, however, the Bhakti element in the philosophical speculations was again forgotten and the materialistic philosophy got the upper hand. Sri Sankara's Vivarta-vada and theory of illusion, Bhaskara's Parinama-vada and Sri Ramanuja's preaching of equality with Narayana in the mukti stage, clouded the whole issue, and there began an unbridgeable gulf between Upasana (psychic practices) and philosophy. As a reply to all these

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12. Purandhara Vithal
Vijaya Vithal
Gopala Vithal
Jaggannatha Vithal

Tukaram
Kabir

movements, the realistic philosophy of Sri Madhvacharya held out the beacon light of 'Bhakti' through God's grace (Prasada) as the absolute means to emancipation, and the Upanishadic passage 'Vidyayamritamishrute' is reconciled by finding a strong element of 'gnana' in the body of Bhakti. It was pointed out that Bhakti, though an easy weapon to obtain God's prasada (Shrimad Bhagawad Geeta), is very difficult to achieve. True Bhakti will grow up from firm virakti in the world, on the one hand, and dedication of oneself to God Narayana as the ultimate Highest Shelter, the most independent, all-pervading principle, on the other. This knowledge and the austere conduct to aid its acuteness cannot be had at a moments' notice. By a regular practice, under the guidance of the adepts, and by a regular study of sastras and by keen observations, the coarser elements, *i.e.*, the rajasa and tamasa parts, of the mind should be eliminated and a finer Satvik plane prepared, so that the refined mind could be a suitable receptacle for the manifestation of the God, as long as the subtle body ('Linga Deha') is attached to the soul; and, with the grace of God, when this material subtle body and the mind wither away, God Narayana will manifest himself in the spiritual mind ('Swarupamanah') of the soul.

The Dvaita philosophers and teachers were quite conscious of the implications of the message of Bhakti to the masses, composed as they are of souls in different grades of evolutionary progress. Though the message is common to all, the details vary according

to the capacity of the aspirant. The Vaishnava saints of Karnataka, following the lead of Sri Madhvacharya, had a stupendous task of discharging this onerous responsibility.

The *realistic* philosophy of Sri Madhvacharya,¹³ held out the beacon light of devotion. The devotees or the Haridasas, were convinced that happiness and sorrow follow each other and both are equally undesirable, inasmuch as they stem from attachment to wordly objects. When understood, that these phases of mental and emotional upheavals are to be borne with equanimity and not attributed to the objects *per se*, as they are incapable of acting without the agency of God, then the two main forces - of material attachment and wrong identification of oneself as an independent factor get divested of meaning leading to happiness in the real sense. There is thus not only variety in the experiences, but also the attitude depends on the evolutionary stage of the soul.

According to the Dwaita philosophy, the Highest Agent is God Vishnu who pervades, sustains and guides the universe. The Haridasas have contributed to the spiritual and cultural wealth of the world by pointing out the futility of human effort. The ethical code they preached was one which restored a sense of balance

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13. R. S. Panchamukhi, Karnatakada Haridasa Sahitya, Kannada Sahitya Parishat, Bangalore 2, 1952, and H. K. Vedavyasacharya, Karnataka Haridasaru Parimala Research Centre, Nanjangud, 1965.

in a society apparently filled to the brim with inequality and misery by offering everyone, according to one's own capacity, a method to benefit from their teachings. They laid stress on Upasana (meditative practices) and were themselves known to possess an intuitive perception of God, apart from being masters of philosophy. They drew from the Vedas, the Upanishads, the Puranas and the Smritis, as well as the Bramhasutras or the Vedanta Sutras as expounded by Sri Madhavacharya and the commentary of Sri Tikacharya. In their songs, which are biographical, socio-religious, ethical, ritualistic, didactic and philosophical, narrative and eulogistic, they explain their conception about God, the individual souls, the world of matter, the mutual relationships, the moral life, the state of liberation, the law of Karma and the process of emancipation from bondage.

According to the Dwaita Siddhanta,¹⁴ Sri Hari is the Supreme God, independent and all powerful, is unaffected by the Gunas, Satva, Rajas and Tamas, is responsible for the eight states of creation, protection, etc., and is the saviour of those who solely depend on Him, His powers being inscrutable and infinitely compassionate. Lakshmidēvi is associated inseparably with him and holds the highest place among all *chetanas*. She regulates the world of matter, is unaffected by it and subordinate only to Him. Vayu, embodiment of Satva,

14. Purandara dasa, Bangalore edition, Part II, 33, epitomises the dvaita philosophy.

is the highest among dependent Jivas, is unaffected by the three gunas his knowledge is infallible and corresponding to the Vedas and he is never susceptible to ignorance, wherefore he is the Jagadguru. The individual souls are classified under three groups - Satvika, Rajasika and Tamasa. The first is further divided into five classes- Devas, Rishis, Pitris, Chakravartins and Naras in descending order. Sri Hari is the *bimba* of all Jivas. The different intrinsic capacities and characteristics determining the *taratamya* are detailed in the various tatva suladis and the Harikathamritasara of Jagannatha Dasaru.

The next proposition is that the creation is real and the differences among the various constituents and as between them, namely Jiva, Jada (matter) and Paramatma. are natural and eternal even in the state of Mukti, Mukti is the state of unmixed joy, the extent of and the capacity to experience it varying from soul to soul and is described in the "Vaikuntha Varnana" of Sri Vadirajathirtha, as also in the works of other Haridasarus. Sri Hari must be propitiated to attain Mukti, through Bhakti and renunciation - Virakti. The latter is possible through learning under a Guru. The Haridasarus did not advise fleeing away into the wilderness, but exhorted: "Live the life of a hero and fight ignorance with courage, with unflinching faith in God Sri Hari and detachment from the selfish worldly pleasures."

The scientific merits of the works of the Haridasarus, even if these could not be readily appreciated,

are sufficiently adaptable, programmatic and versatile to accommodate the facts. The names of Haridasarus became a household word for the other reason though, namely that they had something very interesting to say about mankind. Their works became common currency leading to a high sentiment having its origin in social instincts, having the approbation of the society steeped in religious feeling and being popularised by instruction so that a moral sense or conscience became as common as a habit among people. The more educated of these, could grasp the mental powers of the Haridasarus who were gifted with the mathematical, the artistic and the musical faculty. Thus, though the scientific merits did not have a rapid percolation through society, considerations of another kind were accepted and assimilated with their emotive metaphors and far-reaching implications of man's image of himself. Further, as the inter-generational authority over several centuries was involved to expound a whole spectrum of social, political and religious attitudes, their prestige grew. From a strictly scientific standpoint of view, the traditional predecessors of the Haridasarus were not mere precursors of their ideas, but were actually considered as their preceptors whose ideas played a decisive role in the successive adaptation and successful dissemination of scientific ideas towards the forming of an inexorable doctrine. The state of Society in Karnataka was so favourable for reinforcing and conferring respectability on the institution of the Haridasarus that their metaphors

became household words; they were so malleable even when detached from the original context. Thus, when the full force of their argument is grasped about the method of nature, we see that a new stage in history is reached. They felt passionately about social issues and problems of mankind, such as untouchability and orthodoxy, and pleaded for an edifying and ennobling ascent of man with unusual courage and energy substantiating a full belief in an ultimate and intellectual origin for the scheme of things. Certainly, the reinforcing of the growing scepticism between scientific discoveries and the christian faith, which can be seen in the then contemporary western society, cannot be perceived here even in a minute proportion. The devoutly religious investigators may not go beyond the simple language which was used for the ordinary people to understand, and may not arrive at the main purpose of their scientific investigations. The real development in their thought was articulated with increasing clarity and conviction by the later Haridasarus based on the work of their preceptors, so that mere emphasis on verbal precision or literal meanings was just important at a different level.

CHAPTER III

TOWARDS A MODERN REFORMULATION OF THE HARIDASA METHOD

Introduction :

Paradigms¹ are what govern normal scientific activity which could be a new theory, an experimental procedure or a discovery based on both. The aim is to fill in gaps in the theories by evaluating contents, improvisation, the precision and using the paradigms in hitherto unused areas. The anomalous features are usually labelled as exceptions or ignored. When all the unsolved problems mount up to a degree, testing the adequacy of sciences, the conditions are favourable for a new scientific revolution to be born. Then, in such an event, there is always a choice between whether one should stay with the old theory or join the new set of beliefs which provides a way of thinking afresh about the world. The standard techniques of acceptance or rejection fail when the theories belong to two radically different "disciplinary matrices"²

1. Morton L. Schagrin, "On being Unreasonable" Philosophy of Science, March 1973.
2. Kuhn T.S. The Structure of Scientific Revolutions, Chicago University Press, 1962, and Kuhn T. S. "Reflections on my Critics" Criticism and Growth of Knowledge, I Lahatos and A. E. Musgrave, Ed Cambridge University Press, 1970.

Kuhn claims that the individual scientist steeped in traditional values chooses his theories on the basis of "accuracy, scope, simplicity, fruitfulness and the like". However, different individuals make differing judgments and, even when the criteria are agreed upon, it need not necessarily lead to the same preferences between theories, due to lack of objectivity in measurement inherent in the criteria themselves. But when the methodology is consistent, it follows logically that two people having a different set of hypothesis initially must converge eventually to the same conclusion.

Herein lies the subtle difference between *rationality* where logical relations are made explicit and *reasonableness* where one has to evaluate the reasons and distinguish and rank them by taking into account empirical evidence and other well-established scientific theories. Reasonable choices can lead rational men atleast in successive rounds to converge towards correct beliefs, when they are dealing with objective matters of fact. The same process can also lead them further away from fact than they were at the beginning, if the initial marks are not based on fact. Instead of relying on prior principles and beliefs to test one's own propriety and relevance of reason, which any way cannot again be given an objective status, it is better to start from belief based on facts. In terms of overall credibility preservation, the value that any individual places on statement is a function of his own previous experience, knowledge and belief. Some would critically assess hypothesis in a traditional

sense by deliberating scientifically on the capability of prediction, and the promised utility which are not quantitative considerations. Alternatively, one could have a whole research program³ where the "hard core" of theory is surrounded by auxiliary hypothesis, assumptions; the process of revision goes on round the hard core without affecting it, better theories make the program progressive. If a new theory is theoretically progressive, that is established logically and the content is empirically corroborated, then it must be chosen preferring it to the old. A bench mark is required again, however, to know whether we are in step or out of step. Science needs both conservatives and heretics. "Conservatives are needed to prevent science from rushing off in different directions when an anomaly is detected; heretics are needed to prevent complacency and to provide alternatives when the older theories get into severe trouble. By vigorously defending his own beliefs and criticising that of others who differ, everyone participates in the dialectical dynamics of the group activity called science"⁴

The logic of the concept of scientific progress is nothing but the path of the process of inquiry as it goes on: the goal could be a final comprehensive theory which will be attained or will be approached

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3. Lakatos I "Falsification and the Methodology of scientific research programmes" Criticism and growth of knowledge, Cambridge University 1970.
 4. Morton L. Schagrin

as a limit. The rational and empirical character of scientific knowledge precedes the final terminal theory. The second reason there is perpetual revolution in science is the infinite complexity of the universe. It seems possible that, due to symmetries and dualities, countless alternative theories tie for first place. For any given set of experimental data, there are an infinite number of hypothesis that could explain data equally well. Some probably fear that initial inquiry will stop if we reach the final theory. But it cannot be so, at least it need not be so, certainly not until we know that it is the final one, and, even then, we would still have the job of teaching it. Three distinct, though not unrelated, senses of realism are relevant in any enquiry:

- 1 Realism as opposed to nominalism affirms the ontological status of universals represented by property terms.
- 2 Realism as opposed to idealism affirms the existence of mind independent objects.
- 3 Realism as opposed to instrumentalism affirms that sentences containing theoretical terms may be true or false and that descriptive theoretical terms purport to existing entities, their properties and relations.

Variable-definition and measurement are important areas which lie in any pre-scientific enquiry and can be persistent traps of confusion. If this is combined with a methodologically chaotic situation in which

inappropriate comparisons are made, the consequence is that scientific basis of the findings will be misunderstood. When all possible variables are included in the analysis, suitably defined down to their core and independent content, then the approach will yield some kind of highly reliable 'truth'. In other words, the results depend on one's own interpretation and presupposition imposed on data collection.

The basic idea is that the perception and the comprehension of meanings depend on internally stored representations of experience which provide a cotextual script or frame. Language is thought to serve an internal mediating function, allowing people to monitor and direct their thought processes, and generalise them from one mode of thought to another. The deep feeling that phenomena *appear* complex is the main feature behind the expectation to find a simple solution at the root. The fundamental assumptions of physical science are found to be illogical or untenable, unless certain properties are assigned to space and time. Therefore, the laws of cosmology are, in effect, results of a prior assumption in physical science. Mere axioms then lead to deductions similar to any pure science leading to the body of the knowledge known as cosmology which is fundamental to all scientific consideration.

Most people follow the extrapolating attitude, the deductive attitude or a path in between. Scientific progress is possible only when there is no self-satisfied

unanimity; yet, a lack of understanding leading to differing points of view is also fruitless. "We can talk again about unsubstantiated conjectures that cry for explanation by implausible and untestable hypotheses that hypostatize ideas that are innate in the mind as non-ideas"⁵. In the absence of means of identifying different measuring procedures as determining the same quantity, scientific investigation becomes impossible. If each measurement were given a different name and thereby assumed to measure a different thing, then we could not discover regularities in nature. Theoretical terms can be understood in two ways:

1. Correspondence rules which tie theoretical with observational terms.
2. Implicit definitions which impose a logical structure on theoretical terms by means of the postulates of the theory.

How do we establish the existence of a significant linear ordering relationship? We need a functional relationship concept and its definition with respect to the theory.

A realist account of measurement is committed viewing of quantity concepts or having referents, having descriptive content for the terms in terms of the

5. Nelson Goodman, "The Epistemological Argument" in The Philosophy of Language, Edited by J. R. Searle, Oxford Readings in Philosophy, 1974.

physical laws that govern them. A realist account is the best for both the logic of quantity concepts and the scientific measurement practices.

Bridgman's⁶ operational analysis is: "To know the meaning of a term used by me, it is evident, I think, that I must know the conditions under which I would use the term and, conversely, to know the meaning of a term which my fellow uses, I must be able to reconstruct the conditions which compelled the use of the term by him. Analysis of the conditions attendant on the use of the term is an analysis of operations. From this point of view, meanings are operational."

This view prevents obscurantism either in the form of undisciplined scientific speculation or in the guise of faith in moral and religious absolutates. However, exclusive concern with the operational aspect of meaning has to pay the price of ignoring such areas as history, psycho-analysis or even cosmology. There are three factors in the theory of knowledge – the knowing mind, the process and the thing known. In social science, we have those who want to restrict investigation to precisely measurable phenomena and others who regard it as sterile and stultifying; many philosophers of science think there is much left to be desired even in a logical formal deductive approach. The pragmatist and the analyst are two categories where the latter stops

6. P. W. Bridgman, Reflections of a Physicist, New York, 1955.
See also his "Logic of Modern Physics" 1927.

at logical analysis of meanings, the former insists on it providing a basic guide to action. We emphasise the need for a framework for facts and deride hypothetical constructs as there is no one absolute and correct meaning or definition of such a construct, inasmuch as the definitions depend on the observables selected as a basis for inference; although such definitions do clarify usage, they are inadequate building blocks for models. Verbal definitions are only the beginning; the aim of a social science or any science for that matter is to be able to describe and record the phenomena under investigation as precisely as possible.

Two important features of any kind of measurement are reliability – the extent to which the measure is consistent, and validity – the extent to which it is measuring what it is supposed to. The Haridasarus did not allow unverifiable attitude or ideologies to suppress incontrovertible, logical and empirical facts. The society which we are interested in shaping is one whose structure, culture and future potentialities are shaped by applying scientific knowledge to practical problems. The practice of methodical empirical enquiry is necessary to study the society from an intellectual standpoint in the investigation of inter-relationships of beliefs, values, attitudes and social structures as engines of social change. The expression of these facets in the work of the Haridasarus had internal consistency and a unified outlook on the world. The aim of scientists is to create knowledge by discovering

the laws of nature unaffected by human agency. The structure of science then would reflect the structures of natural events. Since systems of thought are used to study them, science becomes a discipline, a process of the development of new ideas. A history of such ideas is based purely on the intellectual method to explain the structure, and theories would be developed which would not contain discrepancies as regards the natural events or yet logical inconsistencies within the theories themselves. This is an effective approach and is concerned only with the body of theory, the experimental and mathematical techniques related to it leading to a conceptual analysis of science. The social variables that operate have led the social scientist to consider what he calls the processes of *Social Change* affected by behavioural parameters. The social value of scientific knowledge is what is now called for wherein science becomes independent of religion and coupled with technology. The intrinsic advance of science has been affected by the subtly changing extrinsic factors of socio-cultural attitudes. Today there is unification between the theoretical knowledge and the academic reasoning tool, with techniques of experimentation and empirical observations, leading to an universal nature of scientific method and its acceptance by an international community of scientists. Any logic of a scientific system would begin with criteria which relate to the scientists, own philosophy and attitude towards comprehensiveness, function and goal of research. Next comes the Protostates or the definite assumptions which show his awareness of

background issues. He, therefore, begins with definitions or constructs developed to locate and isolate the domain of work, the postulates which denote the formal relations, the data variables and units are then marked out on which investigative operations are performed. The final stage is the creation of formulae, equations or principles⁷.

a) **Enunciation of the Basic Postulates of the Dasas**

i. *Conditions Necessary and Sufficient for Specification.*

From the introductory discussion to this chapter, it can be gathered that a first step towards a framework for facts is a 'secular' notion of classification, which attempts to investigate the *existing* phenomenon. A typical feature of all the Haridasarus was the postulate that defined and classified what - 'is' - what exists. They departed radically from the other method we have talked of so much - the 'curve fitting' or the hypothesising method. They did not impose their own imaginary construction on facts in particular and phenomena in general. What then are the conditions, implicit though they may be, for the existence of any fact? The Haridasarus first marked off this characteristic of creation - of its existence - as against the concept of illusion by talking of a world which was 'Satya' or fact-based. Such a world was therefore

7. J. R. Kantor: The Logic of Modern Science, The Principia Press, 1953.

Time and Space specific. Thus, existence was a necessary and sufficient condition for Specifiability. Specifiability itself was in relation to the Time and Space dimensions binding each fact, both of which are continuous and linear. Time can be trichotomously divided into past, present and future. That fact which existed in the past but does not exist now, that which exists now but may vanish in the future, or yet that which may exist in the future but has not done so in the past or present are all still time-specific and, therefore, specifiable. However, if one tries to visualise—even conceptually—something which neither existed in the past, nor is existing now, nor which will exist in the future, he is unlikely to find a correspondence with fact as it is illusory and therefore unspecifiable. The Haridasarus were only concerned with the real world—a matter of fact world. They neither discussed nor conjectured matters of the ‘unreal’ or ‘irrational’ world, as it was as meaningless to them as the declaration “I am the son of a barren mother”.

While they were involved with Time as a specifying dimension, they talked of three aspects of time ‘Nitya’—continuous existence; ‘Anitya’—that which exists for a short period, ‘Nityaanitya’—like a fraction of time, say a minute, which exists in entirety in its own right and is yet an integral part of the whole stream of the larger dimension of time. That which is not bound by any of these three aspects of time does not exist is therefore not specifiable and hence illusory. Specifiability implies existence in some space and time and calls for

a third feature which we could call 'intensity' or 'normaliser'. The Haridasarus related all facts to these three dimensions, the normaliser, being implicit, converts the space, time and the fact into one conformable entity.

The two geographical primitives of space are Direction and Distance. Distance is pointed out as a very relative concept, measurable in various units by various means. Shape, size and location are also geographically important. New cocepts are connectivity between different places and levels, man and relationships, and depend on healthy human perception and attitudes to certain global connections. As regards time, to differentiate between appearance and reality is to implicitly assume a directed flow of time⁸.

The notion of "now" and becoming remain focal points for discussion of time such as the ontological status of past, present and future and the anisotropy of time. An abstract object attribute system is a formal structured system consisting of objects and attributes and the relation as between them. Each attribute may lie represented in several physically equivalent ways. The set of correlates may be analysed and structured in a particular way, the problem is: how large should the set be? and how long must it be extended in time? If the world were entirely chaotic,

8. Yehudah Freundich, "Becoming and the Asymmetries of Time" Philosophy of Science, 1973. Volume 40

we could not speak of cause or effect. We, therefore, have attempted to define appearances and link it to reality through a wider set of correlated appearance, *via*, the correspondence rules. In dynamic times, past and future are encapsuled within the present. The past is that of which one has memories and the future is one of which one has expectations. Phenomenological time is asymmetric, as the present import of a retrodicted past event is dissimilar to that of a predicted future one. The latter has no present physical state of affairs correlated by the future event, except the expectation based on the present event. Physical time is an abstract ordered manifold of events such that an event by definition has no intrinsic relation to any other event. We could also ask whether the fundamental phenomenological asymmetrical relation, *i.e.*, that A is before B if, when B's defining appearances are obtainable, those of A are not, (but those of the causal traces of A are) is relative, or absolute, observer dependent or independent, whether it is a triadic or dyadic relation? When compared to the ordering of a partial line, Right - left relations are triadic as they are specified with respect to some observer or reference frame; as there is more than one dimension. The past-present-future trichotomy is defined when, for an event, the traces are obtainable, or there exists defining appearances or we may expect to obtain such appearances. The conventional stipulation is that the speed of light is independent of position, time and direction. We can establish a linear ordering relation between a set of

events, through relationships, "Time flows by us"⁹ in the sense the event exists in the future, becomes present, and recedes into the past. But "Time is Static" as the temporal attribute of an event is fixed (date) and the correspondence rule for this attribute changes in time. Thus, every entity is specifiable when it exists and can be thought of in relation to time, space and a normaliser.

ii. *The Nature of Facts*

An initial classification of the world into animate and inanimate '*Jada*' and '*Chetana*' is a common starting point for all Haridasarus. A world which is '*Pratishhitha*'—which is real and exists—is characterised by '*Bheda*'—*difference* and '*Taratamya*'—a hierarchy. Thus, any phenomenon which exists, which is factual, is specifiable and has characteristics different from other entities. The inanimate objects having an implicit normaliser need time and space to be specific, whereas an animate needs time, space, the implicit normaliser and a value scale which places the animate in an unique position *vis-a-vis* the other chetanas. The possession of a value scale is the difference between an animate and an inanimate. Thus, when a common implicit normaliser is present in all creation, the world becomes '*Pancha-bhedatmaka*'. That is to say, every animate is different

9. Mc Taggart J. M. E. "The Nature of Existence" In The Philosophy of Time, Ed. by R. M. Gale, New York Anchor Books 1967.

from every other animate, every inanimate is different from every other inanimate every inanimate is, of course, different from every animate, and, in turn, both are different from the implicit normaliser which transforms each entity into a conformable entirety in a specific space and time. When we talk of facts, it need not be any mere physical object, but could range from the physical world to any abstract concept.

iii. *Facts and Specifiability.*

So far, we have elucidated, in detail, the specification process and the nature of facts, while just mentioning the normaliser as an implicit factor. For the process of specification, time and space are necessary conditions, and the normaliser becomes a 'sufficient' condition in the mathematical sense. That is, while, without time and space, we cannot define anything, we do not need anything more than a normaliser to understand the phenomenon completely. Mathematicians understand a normaliser as a transformer which converts two separate entities into a meaningful third entity. For example, if $O = f(L, K)$, where O is output, L is labour and K is capital then f is the transformer or the *rule* which converts two discrete entities of labour and capital into output. Since the 'norm' in each case is fixed, it has to be linear and cannot be non-linear. In other words, the normaliser is always Unity. Representing any fact, be it physical or a concept in terms of a normalised figure, we can see it as a point in a three-dimensional space with the normaliser acting

as the fourth specifying feature. In the case of an animate entity, the value scale positioning the animate becomes an additional fifth feature. Thus, any fact is specifiable when the implicit or explicit normaliser is identified and it is viewed in a linear - '*vectorial*' perspective. It can therefore be immediately deduced that there cannot exist a non-normalised entity, or an unspecifiable fact.

b) The Operational Meaning of the Conditions :

i) *Derivation of Propositions concerning Relations*

When two entities are thus related through a normaliser, the third entity is a completely different and new object having some of the characteristics of the first two entities, but it is neither the one nor the other as has been seen in the output labour-capital example. The transformer can be a relation, a rule, a set of weights, a scale, a specified height or a value rod, depending on the phenomenon that is investigated. What is important, however, is the perspective of distinctness with which the phenomenon is viewed. This is the main methodological contribution of the Haridasarus. When this transformer is a relation, and a set of relations is operating simultaneously, we have a structure.

In modern mathematics, a relation is defined by two sets (which may be equal) together with a statement which is either true or false when it is used to link any member of one set with any member of the other set in a *prescribed order*.

A relation on a set A is *reflexive* if (x, x) belongs to the solution set of the relation for every $x \in A$. The set of ordered pairs for which some given relationship holds is called the solution set of the relation concerned. A relation on a set A is *symmetric* if (y, x) belong to the solution set wherever (x, y) belongs to the solution set $(x, y) \in A$. A relation on a set A is *anti-symmetric* if, whenever (x, y) and (y, x) both belong to the solution set, then x and y are the same element. A relation on a set A is *transitive* if (x, z) belongs to the solution set whenever (x, y) and (y, z) both belong to the solution set. A relation on a set A which is reflexive, symmetric and transitive is an *equivalence relation* on A . A relation on a set A which is reflexive antisymmetric and transitive is an *order relation* on A .

ii Formation of Relations into Structures

'Structure' means there is a specific interconnectedness among its constituents. These are distinguishable elements and they constitute a system which persists over time as a coherent and integrated whole. Structuralism is not so much a doctrine as a distinctive method. Levi Strauss ¹⁰ maintains that the essence of the 'Structuralist' method seems to be in the deliberate

10. Claude Levi-Strauss 'Les Limites de la notion de structure en ethnologie' in R. Bastide (ed) Sens et usages du terme structure dans les science et sociales. The Hague, 1962.

construction of abstract models by the artificial breaking down of the object under study and its subsequent reconstitution in terms of essentially relational properties. Some hold the view that the structuralist theory is not distinctive to quite the degree it is apt to be claimed for.¹¹ There could be two explanations for such a view. One is that, when each entity is described in its minutest detail, the sense of wonder due to ignorance vanishes and we find it nothing extraordinary. Secondly, when the tendency to generalise and hypothesise in terms of increasingly wider frames of reference, is rampant, that theory which suggests a fact-based analysis falls naturally out of popular favour. It must, however, be accepted that a structuralist view of facts is distinctive at least inasmuch as it highlights the 'distinct' nature of facts.

From the point view of our own methodological discussion, one point must be emphasised here, which lies at the root of our analytical focus. The structure is '*indecomposable*', again in the mathematical sense. That is, once an ordered set of relations is used to describe a certain phenomenon structurally, there is no possibility of each relation moving in different directions independently of the others in a non-linear manner. A structure is interdependent, indecomposable and therefore linear. It follows what is called in Economics

11. W. G. Runciman "What is structuralism" in The Philosophy of Social Explanations, Ed. by Alan Ryan, Oxford Readings in Philosophy, 1973.

the constant returns to scale principle, so that everything within the structure moves proportionately.¹²

C. A Modern Transformation

i. *A one-to-one Transformation of the Basic Postulates in terms of Modern Mathematics*

As we have in the two earlier sections been discussing the basic postulates of the Haridasarus in terms of modern mathematical building blocks, we can readily demonstrate their one-to-one correspondence with the basic postulates of the Haridasarus. The moment a normaliser becomes crucial to specify a fact, and the normaliser is a relation, even if it has one element in it, it is a vector and not a scalar, as the origin and the scale of the element are already implicit in it. For example, the simplest of transformers a multiplier, say 2 – is a concept wherein the origin 0, a starting point and the scale – a distance marked off as 1, occuring two times from 0, – is already embedded in it. Hence any fact which is to be specifiable is already a normed entity, is a vectorial concept – which is an ordered array of numbers or entities. Once this is clearly understood, all the concepts of the Haridasarus

12 There is no switching or yet reswitching of processes due to non-linear and independent movement. Several major theoretical contributions based on the constant Returns to Scale principle have been made by the author as well as his research students. See bibliography

follow and correspond easily to the propositions of vector analysis or matrix algebra.

The propositions and operations of matrix algebra then can be seen as applied to the processes operating in the world. Just as in Economics a production process is denoted by a vector, real world phenomena can be specified as vectorial and, therefore, structural entities. All the propositions for a structure naturally become applicable to the real world of facts :

Thus, a number can be used to represent a point on a line, once a unit length is selected.

A pair of numbers (*i. e.* a couple of numbers) (x, y) can be used to represent a point in the plane.

We observe that a triple of numbers (x, y, z) can be used to represent a point in space, that is three-dimensional space. Instead of using x, y, z , we could also use (x_1, x_2, x_3) .

Although we cannot draw a picture to go further, there is nothing to prevent us from considering a quadruple of numbers (x_1, x_2, x_3, x_4) , saying that this is a point in four-space, then would come a quintuple, a sextuple, septuple, octuple..... We let ourselves be carried away and *define a point* in n -space to be an n -tuple $(x_1, x_2, \dots, x_n)$ if n is a positive integer. We shall denote such an n -tuple by a capital letter X and try to keep small letters for numbers

and capital letter for points. We call the numbers $x_1, x_2, \dots, x_n$ the *coordinates* of the point X .

If $A = (a_1, a_2, \dots, a_n)$ and $B = (b_1, b_2, \dots, b_n)$ are two points, we define A and B to be equal (*i.e.* $A = B$) if $a^1 = b_1, 1 = 1, 2, \dots, n$. We define $A + B$ to be the point whose coordinates are $(a_1 + b_1, a_2 + b_2, \dots, a_n + b_n)$. For example, in the plane, if $A = (2, 3)$ and $B = (-3, 7)$ then $A + B = (-1, 10)$. Furthermore, if c is any number, we *define* cA to be the point whose coordinates are $(ca_1, ca_2, \dots, ca_n)$. We observe that the following rules are satisfied :

$$(1) \quad (A + B) + C = A + (B + C)$$

$$(2) \quad A + B = B + A$$

$$(3) \quad c(A + B) = cA + cB$$

$$(4) \quad \text{If } c_1, c_2 \text{ are numbers, then} \\ (c_1 + c_2)A = c_1A + c_2A \text{ and } (c_1 c_2) A = c_1 (c_2) A$$

$$(5) \quad \text{If we let } 0 = (0, 0, \dots, 0) \text{ to be the point} \\ \text{all of whose coordinates are } 0, \text{ then} \\ 0 + A = A = A + 0 \text{ for all } A.$$

$$(6) \quad 1. \quad A = A \text{ and if we denote by } -A \text{ the} \\ n\text{-tuple } (-1)A, \text{ then } A + (-A) = 0.$$

We interpret geometrically addition of two points A and B as the fourth vertex of a parallelogram whose

three vertices are $O = (0, 0, \dots, 0)$, $A = (a_1, a_2, \dots, a_n)$ and $B = (b_1, b_2, \dots, b_n)$.

Multiplication of A by c amounts to stretching A by c .

Located Vectors :

We define a *located vector* to be a pair of points

which we write $\overrightarrow{AB}$. We visualize this as an arrow between A and B . We call A the beginning point and

B the end point of the located vector $\overrightarrow{AB}$. Let $\overrightarrow{AB}$

and $\overrightarrow{CD}$ be two located vectors. We shall say that they are equivalent if $B - A = D - C$.

The word "structure" is found extensively in the literature of the social sciences. Social structure and such related concepts as "kinship structure" "authority structure", "communication structure" and sociometric structure are quite common. But, despite the widespread use of structural concepts in the social sciences, it is fair to say, that the formal analysis of structure has been relatively underdeveloped in these fields. The technical terminology employed in describing structures is meagre; few concepts are defined rigorously. The abstract notion "structure", is concerned with patterns of relationships among pairs of abstract elements. As such, the structural theory has reference to the empirical world as well as the abstract. It has high potential

usefulness to the empirical scientist, for it can serve as a mathematical model and tool having real word structural properties thus easily relating to any empirical system consisting of relationships among pairs of elements.

Consider, for example, the "communication structure" of a group of people. We may conceive of each member of this group as an "element" and the fact that a particular member can communicate directly to another as a "relationship". Thus, upon coordinating these empirical entities and relationships to the abstract terms of a vectorial view, we obtain a clear picture which represents the communication structure of this group. The properties of this graph are, at the same time, properties of the communication structure.

In a similar way, a "sociametric structure" may be conceived as consisting of elements, which are people and relationships among pairs of people, as indicated by interpersonal choices obtained from a questionnaire. A structural model may be constructed to represent any particular sociametric structure.

As another example, consider an individual's "preference structure" for a set of objects as revealed by the method of paired comparisons. In this case, the elements of the structure are objects, for example, pictures, and the relationships are the individuals' indicated preferences of each object relative to each

other. Again, the resulting structure may be easily represented vectorially.

It is not easy to choose between the various numerous analogies and references in the works of the Haridasarus as Kannada quotations are difficult in an English text. However, we give below a few propositions and analogies to illustrate our point briefly to be dealt in detail in a subsequent volume. One of the Haridasarus¹³ made a proposition which has been proved mathematically in a different context entitled existing coefficients are optimal". The first three words tally with the building blocks we have developed so far from their postulates. The coefficients could be seen as components of a vector specifying any process or phenomenon "Optimality" when seen not in the normative, subjective sense but in an equilibrating, mechanistic sense yields a criterion of *appropriateness* with respect to the implicit normaliser. Since the existence is also specified with respect to the *same* normaliser, as has already been seen, 'existing coefficients' or facts are appropriate and cannot be bettered and are, therefore, optimal. A figurative illustration which is poetic is the reference to the implicit normaliser which is as *pervasive* as "ghee in milk"¹⁴ or "fire in firewood" or "fragrance in flower".

13 See Shri Purandaradasaru's popular pada "Aaadaddella oli the Aaaycethu" meaning "all that has occurred is for the best".

14. See Harikathamritasara — Jagannatha Dasaru, Second Chapter.

Yet another extremely utilitarian classification, which is exhaustive but mutually exclusive, is the classification of all edibles and potables into four, on the basis of the process of eating; gulping, chewing, licking and drinking. The metaphor of the bees is another frequently used tool and is also common to western literature. Thus we can read every line in the works of the Haridasarus in terms of the basic concepts and study, in further depth, the operations of the framework for facts. What must be mentioned is the marvellous precision in their description, classification and analysis of facts when even metaphors, analogies or figures of speech are not used for sheer poetic fantasy but with an eye for accuracy which is further set to music; indeed, it is music and metaphysics rolled into one!

ii. *The Need for and the Usefulness of such a Transformation.*

If the reader has been convinced that it is not for the sake of mere semantic acrobatics that the entire exercise has so far been pursued, then the whole range of applications of such a transformation will immediately open up before his eye. We need not labour further on the necessity for a fact-based theory which our transformation has enabled us to extract, embedded, as it is, in the works of the Haridasarus. As an alternative to a framework for fact, we only have the process of foisting imaginary constructs and hypothesising vacuously. Such a tool would not be useful for

empirical investigations and, even when used, would not be accurate. On the contrary, by transforming the basic postulates of the Haridasarus into modern mathematics, we would have related facts to a framework which is based on a vectorial view of reality and is therefore 'efficient' in the sense of satisfying efficiency conditions as known in Economics. Moreover, no assumption is involved here and, hence, the model is not only theoretically consistent but also empirically relevant. In sharp contrast, a "curve fitting" method begins by making certain assumptions and, though satisfying the internal consistency test, arrives, through deduction, to a conclusion which may well be the same assumption with which we began!

The additional advantage of the vectorial view or the structuralist method is that it is not only static but also dynamic. Such a framework can take into account changing phenomena and incorporate the changes into a stable trajectory which continues to possess stability properties over time. This property has been proved in a theorem by the author ¹⁵ and the result has been applied by him, as well as his students, in a wide range of areas - from development planning to managing public delivery systems to provide basic necessities to the rural poor. The variety of areas ranges from econometric theory, economic theory, capital

15. See R. Bharadwaj: "A Theorem on Implementing a Central Strategy in a Decentralised Set-up" Indian Econometric Annual, October 1974.

theory, information theory, environment, portfolio analysis international trade, theory of policy and so on, wherein more than a hundred applications, have been made so far.

d. The Application of the Vectorial View

i. *A structural Formulation and an Empirical Tools*

Beginning with the nature of facts as the Haridasarus viewed them, we derived the conditions for specifiability, showed that facts are specifiable and hence normed entities which can be seen as relations, a set of which relations would form a structure. This process was shown as being equivalent to the propositions of matrix algebra and hence renamed as the vectorial view or the structuralist method.

Such a structuralisation process is also of great use. An example can be readily provided in the context of public service delivery systems.¹⁶ Delivery has always been thought of as an unidimensional concept which has several pitfalls, as there cannot be a scalar entity when phenomenon is viewed vectorially.

In spite of the delivery process being a dynamic one, it has not been viewed against a time frame. But that is just a view which would only touch the

16 See Gecta Bharadwaj, "Improving Public Service Delivery Systems for the rural poor: Some new methodological interventions", Journal of University of Bombay, 1978-1979.

periphery of the problem. Whether for goods or services, the delivery function is an implicit and intangible one resulting from an interaction of several constituents. This important dimensional problem has been ignored while viewing the delivery system as a "from - to" process. This deceptively simple way of looking at the public service delivery system has been the main reason why we have been unable to decipher the causes behind the ineffectiveness of the process. The confusion gets aggravated when this lack of a total view erroneously identifies partial causes as the culprit.

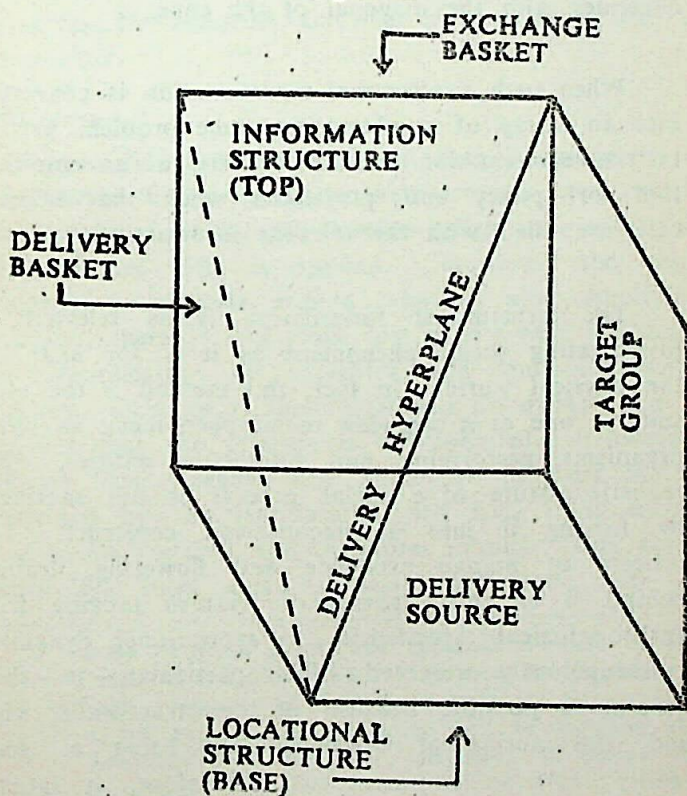
Although the process of delivery seems to be an invisible concept, the several actors in a public service delivery scenario are very much tangible. Apart from who delivers to whom, "what" is delivered in exchange for "what" also becomes crucial to the structure. This exchange would, of course, occur in various locations giving us the spatial dimension. That the actual delivery occurred due to a *total* communication of information is a further constituent.

Thus, we have the commodity structure, including tangibles and intangibles, the target-group structure and their mutual interaction occurring through the medium of information in a time-space continuum. When the purpose of the two extremes of the delivery process matches, the delivery function could be said to be effective or successful. This equilibrium condition would presume that there is mutual awareness and acceptability of the purpose or goal through

the information matrix. These factors assume a critical role in the functioning of delivery systems when the rural poor of developing countries are the target group.

The following diagram provides a visual appreciation of the foregoing discussion (see figure 1).

Figure 1



The DELIVERY HYPERPLANE is a resultant of the interactive forces between target groups and DELIVERY SOURCES, EXCHANGE BASKETS and DELIVERY BASKETS; INFORMATION and LOCATIONAL STRUCTURES. When these forces are in equilibrium, the goals of the DELIVERY SOURCE and TARGET GROUPS match to give the cubic form and the DELIVERY HYPERPLANE coincides with the diagonal of the cube.

When such a structural representation is converted into an array of numbers, the same problem gets a matrix representation and can be used as an empirical tool for policy and projection when the different cells are filled with the relevant information.

The structuralist formulation is as relevant to investigating social phenomena as it is for analysing the physical world. In fact, this method is the most suitable one as it can view social phenomena as living organisms performing and interacting entities. The realistic nature of a social process is not sacrificed by forcing it into a preconceived construct. The process of human existence and flowering, trailing behind it an entire gamut of features ranging from anthropological specificities to aspirational dynamics, is scrupulously preserved. This particular - in - the - general is possible because of the structuralist view and the notion of interdependence being a social reality. As an empirical tool, therefore, it satisfies

the rigours of a scientist as well as the requirements of a policy - maker.

ii) *Structuralisation and Applied Scientific Work*

Having discussed the empirical significance of the tool, our next logical step would be to illustrate the utility of the method in various areas such as statistics, Mathematics, Physical Sciences, Social Sciences, Environment, and even as abstract an area as Aesthetics.

Statistics : ^s7

Since Statistics symbolises all that is connected to the curve - fitting approach, there are vast areas which are rendered analytically useless when the strict rod of vectorial view is applied. However, the basic controversy revolves around whether, after specifying relation, there is still scope for error terms, problems of identification of variables and multicollinearity between variables if these problems do exist; then it implies that the relation is not specified. However, as we have already seen from the building blocks provided by the Haridasarus, any fact, if it exists, has to be specified and therefore normed. This automatically rules out stochastic problems, or is

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- 17 Since the actual proofs and applications would be too technical and of interest only to specialists in the field, only a summary of the current state of Arts in each, as well as areas of application will be indicated and references given for those interested, to pursue the contribution further.

inapplicable to real data. Assuming we are not talking of the real world but applying these statistical tools only to some phenomenon on an imaginary planet, once we write down a relation, by that very process, it comes into existence and becomes specific and structural. Thus, the approach to generalise or condense the relation into a scalar quantity gets nullified even before the work of statistical analysis can begin¹⁸.

Social phenomena are far more complicated than most physical phenomena, because billions of people together determine the outcome and yet the individual participants do not all behave in the same way. Alternatively, we may say that it is not possible to find fundamental properties of the behaviour of people that serve as the bases for deductions. The use of statistical and probabilistic methods, which have been developed to estimate errors of measurement cancel the less significant individual variations and give what one might call a simplified or smoothed out account. The statement that intelligence is normally distributed is thus a smoothed out description of the varieties of human intelligence. It does not tell us how much intelligence Ram possesses, but it does tell us the distribution of intelligence among a million Rams! How farfetched from facts!

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18. See C. V. Mendlik: *Foundations of Econometric Methods, (A Theoretical Evaluation)* 1980 Ph.D. dissertation, Bombay University, and V. Shenoy: "The Problem of Multicellularity in Economics: A Theoretical Reappraisal" mimeo 1982.

Mathematics :

Mathematics is a science created as a part of man's efforts to achieve two goals : the understanding of nature and the utilization of natural phenomena to improve the life of man.

It is, of course, true that, once a mathematical theme has been created to further some physical objective, mathematicians have felt free to investigate the theme itself. The justification for such efforts is two - fold. Knowing that the formulation represents a physical phenomenon, mathematicians might hope to deduce more physical knowledge about the very happening which gave rise to the initial mathematics. Secondly, it is characteristic of mathematics that its very abstractness enables it to represent quite diverse physical happenings. Water waves, sound waves and radio waves are all represented in one partial differential equation known, in fact, as the wave equation. Hence the additional mathematical knowledge gained by further investigation of the wave equation, which was first developed in the investigation of sound waves, might prove useful in respect of questions that could arise from the investigation of radio waves.

In the words of Morris Kline, "a mathematical theme is like a piece of oil-bearing land. Dark puddles on the surface may suggest that a particular spot be explored for oil and, if oil is discovered, the value of the land is established. The proven worth of this land warrants further drilling in the expectation

that more oil will be found if the drilling sites are not too far removed from the location of the original strike. Of course, one might choose a very distant site, because the drilling is easier there and still claims that he will strike oil." Some mathematicians have, in fact, defended worthless explorations by making this facetious claim.

Today, many mathematicians go even further and argue that any mathematical theme they choose to pursue is worthwhile, and they point out examples of arbitrarily chosen themes that proved subsequently to be just what the scientists needed. In other words, their argument is, that mathematicians who pursue ideas that have originated entirely in their own minds have, in their wisdom, anticipated the needs of scientists!

The example most often cited is Einstein's use of Riemannian geometry and tensor analysis to build his theory of relativity many decades after these mathematical subjects were created. Let us look into this example. Einstein started to work on the problem of accounting, by means of the structure of space, for motions which were presumed to be caused by the force of gravitation. In 1911, he made public a theory which treated a very special and artificial case and for which he had used rather simple mathematics. He discussed his difficulty with his colleague, a mathematician named George Pick, and Pick called his attention to Riemannian geometry and the tensor analysis of

Ricci and Levi-Vavita, which Pick thought might be helpful. Einstein then found another colleague and friend in Zurich, Marcel Grossmann, from whom he learnt this mathematics. In a few years, he was able to use it to formulate his general theory of relativity. Were Riemannian geometry and tensor analysis just right for the theory of relativity? Almost certainly not. There is ample reason to believe that Einstein merely did the best he could with the mathematics that he found available. Ingenious as the general theory of relativity is, some think it to be contrived; it is not quite useful for the solution of astronomical problems because it is too complicated; and the evidence for it rests solely on the improved accuracy with which it predicts three astronomical phenomena. If the history of science is to be believed, then this theory can some day be expected to be superseded.

The point of this example from history is that mathematics need not always be just right for a scientific theory. The scientist wrestles with a problem. But the solution is not unique. In his efforts to build a theory, he latches on to whatever mathematics may serve to build it. He makes use of the available tools, as a man might use a hatchet in place of an axe and do an adequate job. Was the hatchet, then, just right for the job?

The efforts of mathematicians to establish beyond question the physical soundness of Euclidean Geometry culminated in the creation of non - Euclidean geometries

This unexpected fact gave rise to the question : "Since these geometries differ from each other, what can we really be sure about as being true of physical space ?" This question was Riemann's point of departure. In answering it, he created more general geometries, now known as Riemannian geometries. This discussion demonstrates vividly our view that any abstract investigation without reference to specifiability is not very utilitarian.

Physical Sciences :

Physics has advanced with advances in Mathematics. The ultimate goal of theoretical physics is to discover theories of space, time and matter which converge to a single all encompassing theory. Currently many theories overlap and their applicability goes beyond a domain of one discipline. For example, the same model could be used in several areas ranging from Physics to Economics because it has the same mathematical equations. One physicist would use *his* insight and in order to establish the analogy between Physics and Economics, the Economist would use *his* insight, both however having a basic mathematical insight.

Just because Physics deals with physical phenomena, the theories it propounds can not be said to have a scientific definiteness. For example, the 'Fourier Integral' is used to construct certain functions from sinusoidal components extended over a limited region of space called wave packets which do not have a precisely defined position or wavelength. Similarly, the

position and momentum of a particle cannot be simultaneously precisely specified which is Heisenbergs' Uncertainty Principle.

The new quantum interpretation gives an understanding of small scale phenomena, where classical mechanics fails. But it must also be consistent with classical mechanics for large-scale systems, where classical mechanics is successful. Similarly, the laws of chemical electro-magnetic theory set up by Maxwell, which are successful for large-scale phenomena such as radio aerials, fail for small-scale phenomena such as scattering of photons. The small-scale electro magnetic phenomena are dominated by the quantum effects, just as small scale mechanical processes are. These new ideas came gradually through the works of Niels Bohar, Max Planck, Albert Einstein, Louis do Breughie and others, through a phenomenological approach, where, in setting up a model, you allow yourself to be guided directly by observed phenomena even if you do not fully understand them. The other approach is the axiomatic approach in which, by "genius or hindsight" a set of axioms is set up from which the whole of the theory can be deduced. Physicists are also in the habit of using words loosely as, for example, "Particle", and "Wave" which are associated with certain types of observation. Many of the concepts can be qualitative in the sense of describing a situation rather than the factor quantitatively in fixed terms. For example, the concept of a Bohr orbit. In order to establish that the electron

is moving in an orbit about the nucleus, it should be observed at different points of times and its position recorded. In order to do this, if we focus a light on it, the electron will absorb energy from the Photons that hit it. So, even if the electron *were* in an orbit before the light, it will be in an altogether different orbit now, and this will happen while trying to record at a second instant of time and so on. In other words, both the momentum and the position must be specified simultaneously; but the uncertainty principle prevents this. Hence it becomes impossible to establish that the electron is in orbit.

Contrast this with an example of the movement of smoke particles through a microscope. It seems to move in an unpredictable jittery manner on a "random walk" path. In actual fact, the kinetic theory of gases shows that the smoke particle is bombarded on all sides by the molecule with which air is made up moving at high velocity. The apparently inexplicable and unpredictable motion of smoke particles was so because we have not recognised the existence of the molecules-causing the motion.

At the same time, some of the results appear to run contrary to common sense ; which itself is founded on everyday experiences. Since human senses have their own limitations, the rules of behaviour applying in everyday life need not *a priori* be expected to hold true, outside the limited range. Can one console oneself

that, with greater familiarity, the strange becomes acceptable ?

When one discipline is used to interpret and comprehend another, much of the niceties have to be ignored. Often, mathematically fine points are swept under the carpet to analyse the physical structure of the quantum theory without worrying about such matters. In Heisenbergs' opinion:¹⁹ "We can say that physics is a part of science and as such aims at a description and understanding' of nature. Any kind of understanding, scientific or not, depends on our language, on the communication of ideas. Every description of phenomena of experiments and their results rests upon language as the only means of communication. The words of this language represent the concepts of daily life.....These concepts are the only tools for an unambiguous communication about events". Gradually, over the ages, a common fund of scientific knowledge is accumulated. But, to communicate it, an unambiguous language based on experience and observation between both the parties is necessary. Scientists are concerned with the understanding, prediction and control nature. For the organic chemist, the pursuit of understanding manifests itself in investigations of aspects, of the chemistry of carbon compounds, including the isolation of pure compounds, their structure, synthesis and interactions. The chemist is interested in maximising the yield of

19 W. Heisenberg, Zeitschrift fur Physik 43. P. 197 (1927).

an organic reaction. He sets out to discover the mechanism and thermodynamics of reaction, so as to answer the related question of rates and equilibria.

The theoretical physicist chooses his objective and his methods according to a basic criterion of mathematical taste. The primary question for a theorist is not yet "Will my theory work?", but rather "Is what I am doing a theory?". The material at hand for theoretical work consists of fragments of mathematics, cookbook rules of calculation and a few general principles surviving from earlier days. What combination of these items would deserve the name of a theory becomes the question.

The three main methods of work in contemporary theory are called field theory, S - Matrix theory and group theory, though they are not mutually exclusive. The three methods differ not only in their choice of mathematical material but also in the uses to which the material is put. Field theory begins from a prejudice in favour of mathematical depth, a feeling that deep physical understanding and deep mathematics ought to go together. So the chosen mathematical material is the algebra of operators in Hilbert space, which is combined with various other difficult parts of mathematics in order to reach a structure that embodies some of the salient features of the real world. The emphasis is on a rigorous mathematical understanding of the theory, not on detailed comparison with the experiment. Of the three

methods, field theory is the remotest from experiment, the most mathematically strict, the most ambitious in its intellectual tone and the vaguest in its relevance to physics.

In S - Matrix theory (the S stands for Streu, the German word for "Scatter"), the mathematical material is deliberately chosen to be as elementary as possible. It consists of the standard theory of analytic functions of complex variables, a theory whose essential features, have not changed since it was created by the French mathematician Augustin Cauchy early in the 19th century. S - matrix theory compensates for the weakness of its mathematical base by making heavy use of experimental data. The S - matrix theoretician typically aims at computing or predicting the result of one experiment by making use of the results of others. Sometimes, predictions are made from "first principles" independent of other experiments, and the hope is ultimately to deduce everything from first principles.

In group theory, the mathematical material is a theory of considerable depth and power, mostly dating from the first quarter of the 20th century. The two main concepts are "Group" and "Representation". A group is a set of operations possessing the property that any two of them performed in succession are together equivalent to another operation belonging to the set. A representation of a group is a set of numbers and a rule of transformation of these numbers such that each operation of the group produces a

well-defined transformation of the numbers. The transformations in a representation are restricted to being linear.

The immense power of group theory in physics derives from two facts. First, the laws of quantum mechanics decree that, whenever a physical object has a symmetry, there is a well-defined group (G) of operations that preserve the symmetry and the possible quantum states of the object are then in exact correspondence with the representations of G . Second, the enumeration and classification of all well-behaved groups and of their representations have been done by the mathematicians once and for all, independently of the physical situation to which the groups may be applied. From these two facts results the possibility of making a purely abstract theory of the symmetries of fundamental particles based on the abstract qualities of groups and representations and avoiding all arbitrary mechanical and dynamical models.

A good many people are working on the mathematical basis of the quantum theory, trying to understand the theory better and to make it more powerful and more beautiful. An accidental hit on the right lines, they hope will lead to a future advance in which people will first discover the equations and then, after examining them, gradually learn how to apply them. To some extent, that corresponds with the line of development that occurred with Schrodinger's discovery of his wave equation. Schrodinger

discovered the equation simply by looking for an equation with mathematical beauty. When the equation was first discovered, people saw that it fitted in certain ways, but the general principles according to which one should apply it were worked out only some two or three years later. It may well be that the next advance in physics will come about along these lines: people first discovering the equations and then needing a few years of development in order to find the physical ideas behind the equations !!

One factor that has remained constant through all the twists and turns of the history of physical science is the decisive importance of mathematical imagination. All through the centuries, the power of mathematics to mirror the behaviour of the physical universe has been a source of wonder to physicists.

Even an extremely cursory glance at applied sciences shows the crying need for an alternative fact-based framework while investigating a hard, matter-of-fact physical phenomenon. How much more than the need must be for a structuralist formulation while examining social phenomena?

The Haridasarus have made frequent reference to various physical sciences, as also to biological sciences like the structure of plants, the patterns of leaves, the characteristics of various animals and matters pertaining to geology and geography generally. A separate in-depth study would be required to cover

the versatility and relevance of their contribution in all these areas.

Social Sciences :

Although modern western thinkers may not agree with the sociological theories of the Haridasarus their compositions have direct psychological relevance to the people in that they are sheer marvels in the way they reached the hearts of the masses. The structuralist method can be very usefully applied to Psychology and History as has already been done to the Science of Economics by the author himself.²⁰ By viewing economic phenomena vectorially, a whole new track has opened up which is both logically consistent and empirically meaningful while providing a new orientation to the basic approach to social policy and social engineering.

At the risk of enormous oversimplification, the social sciences, for all their diversity, are concerned with only two major areas of investigation. The first of these is the precise description of how social systems work and how their different parts are interrelated, whether the subject is 'cross-cousin' marriage in a

20 See R. Bharadwaj "On a Contradiction in Sraff's Contribution" Indian Economic Journal 1972, and Geeta Bharadwaj: "International Trade and Economic Growth" 1974 Ph. D. dissertation, Bombay University, and Sharad Sawant: Reswitching Contraverty an Empirical Verification 1973 Ph. D. Dissertation, Bombay University.

tribal society or the contribution of steel industry to the total output of a technologically advanced nation. Studies of this kind investigate and analyse the basic structure. The second area of investigation is concerned with control, that is the effect of conscious operations of social structures and an examination of the rational processes that underlie the formulation of policy. These studies investigate and analyse decisions.

In both fields, same kinds of mathematics are applied to similar problems. When empirical analysis of discrete observations is necessary, much use is made of finite mathematics: in particular, matrices, matrix algebra and difference equations.

For example, the purpose of demographic enquiry requires analysis of the structure and probable development of populations. To project the future structure of any population, assuming a constant pattern of births and survivals, we need three sets of data

- (1) the number of people of different ages alive at a certain date
- (2) the number surviving over a chosen time interval immediately following that date, and
- (3) the numbers born during that same time interval *vis-a-vis* the members of the different age groups. This gives an idea the of static and dynamic problems involved in any social phenomenon which is further complicated by behavioural aspects.

Environment :

A more general area of investigation which encompasses our discussion so far is the problem of environmental management specially witnessed in the context of development planning. The structures of the transformative time cycles in the three basic processes of environment – resource restoration, resource maintenance, and resource use – are so distinct that the dynamics of the problem get complicated. Further, environment is a pervasive entity, inperceptible, yet influencing an influenced by human activities through welfare implications. The problem, therefore, is to comprehend such a circular flow mechanism in terms of a general system which, while being broad enough to encompass the totality of the phenomenon, does not ignore the microscopic specificity of each type of economic context and the stage of development. Using the vectorial view, we could conduct a careful component-wise scrutiny of the various constituents of the environmental dimension.

A four-fold flow mechanism²¹ can be visualised, wherein the economic activity constitutes just a small portion of the given larger environment, as a trapezoid with several layers built in one after another. For example, when the economic activity is viewed as

21. Srze R. Bharadwaj: "Integrating Environment and Development" in "The Environmental Dimensions in Development" United Nations Asian and Pacific Development Instituto, 1979, Bangkok.

flows of commodities, defined as processes, we have a layer beneath it which would be the flow of stocks helping to produce the flows in the uppermost layer or innermost layer, depending on the visualisation. Beneath the stocks which include human as well as physical capital, we have the natural resources which help to strengthen the second layer. However, the role of technology is crucial. It acts as the transformer from environment to the stock and flow layers. This is the one which generates what is called the net environmental effect. The net effect of pollution, as well as pollution abatement, illustrates this concept. Thus, if environmental balance has to be maintained and, at the same time, the economic flows and stocks must increase, then this transformer acts as the motivating force in the sense of both extraction of materials from the environment and their conversion to the relevant goods and services.

Aesthetics ²²

It is not easy to sketch the development of the theory of aesthetics systematically in the absence of a unified approach to the problems raised while talking of aesthetics. There is also a divergence in method between Anglo-American and continental writing in this area. Some launch their discussion on the Phenomenological method of philosophical enquiry, others on the Existentialist theory or yet on a combination

22 Harold Osborne (Ed) Aesthetics Oxford Readings in Philosophy, Oxford University Press, 1972.

of both. Though the basic questions of aesthetics can apply to a plurality of arts as they concern such aspects as artistic illusion, the nature of imagination, the relevance of an artists' intention, etc, yet specific questions, such as nature of poetic meaning or nature of representation, do not have unique or settled answers. The influence of Wittgenstein on aesthetic thinking has been real, though indirect (*Lectures and Conversations* 1966, ed. Cyril Barrett). New ways of thinking about feeling, emotion, intention and perception, coupled with new focus on criterion, norm and explanation were introduced. However, there is a basic conflict in the area of aesthetics that has to be resolved, namely the ultimacy of personal taste and the claim of objectivity of the aesthetic judgement.

Eighteenth century writers, including Hume, believed that there are natural beauties which create normal appreciation, and this led to a standard of good taste thus relating empirically the form and the sentiment. They were not bothered by Kant's logical dichotomy between the valuation and descriptive, factual and normative aspects. Burke too aimed at tracing general laws for the operation of taste. The goal was to discover in the basic constitution of human nature, a norm by which the varied empirical tastes could be standardised. Recently, however the subject matter of aesthetics, its terms of reference have themselves become debatable issues: Instead of the earlier 'appreciation of natural beauty approach' it is now concerning itself with the evaluation of works of art.

The central core of the subject deals with questions of the nature of aesthetic experience and ground of aesthetic judgement. Some differ here, again, to hold the view that the philosophy of aesthetics concerns itself with the clarification of concepts used in literary and artistic criticism and in particular about the concept of style dealing with art in general. If aesthetics must be a coherent body of norms to be called a discipline, then the necessary and sufficient conditions of a work of art must be an area of general agreement. Traditional theories of aesthetics have emphasised the purpose of art and based their definition on it, for example, whether it fulfils the aims of expression, information, evocation, amelioration, imitation and commemoration. The tendency today is that anything could be the object of aesthetic attention, provided it can be presented so as to stimulate aesthetic engrossment. Yet others distinguish between aesthetic qualities and non-aesthetic properties which those with special sensibilities could decipher. They could be descriptive, emotional or structural. What is important is that the appearance of an object is crucial for the aesthetic experience, rather than the actual material itself, as pigments being different from their arrangement on canvas. The phenomenological school gives greater weight to the cognitive than to the hedonistic aspects of the aesthetic experience—expansion of awareness rather than the lure of pleasure. Even if aesthetic experience is not just experiencing pleasure but feeling an emotion, still some common quality that provides

this feeling in one and not another object of art must be pinpointed, otherwise, the philosophy of aesthetics will ever remain a matter of subjective tastes.

Where criticism of art is concerned, comparative statements value assessments of works of art-are made and reasons given so as to induce people to 'visualise' the art object in as close a manner as they themselves do so, by drawing attention to specific properties of appearance, thus being both descriptive as well as evaluative. The philosophy of aesthetics, therefore, deals with whether such appraisals are possible, can be objective and have universal validity.

Another aspect is using art as a means of communication. When the meaning and interpretation of the work becomes important, it should be placed in the context of the artists' intention too.

The intentional fallacy deals with these points. It is impossible from internal evidence within the work of art to detect an unrealised intention of the artist; even if such an intention were known from external works, it could not be used for appraisal, and thirdly, over the years, a wealth of meaning may be uncovered, not intended or aware of by the artist himself.

The structuralist view of Aesthetics or Scientific Attitude in Artistic Work

Art has always enjoyed a prestigious position in India right from the early ages. With the passage of

of time, although the social status of art continues to be more or less the same, it has undergone a tremendous metamorphosis. Interaction with the western culture, technological developments and our own evolution in values and attitudes have had an impact on art and artists. Just as art tries to reflect life, life also influences art. In particular, there has been deepening in the degree of professionalism in art. This has led to the opening up of a number of professional art colleges especially under the aegis of the state. These institutions aim at imparting training in art through a series of purposively designed art courses, thus preparing a cadre of professional artists. Among the various peculiar problems involved in teaching fine arts, the ones relating to methodology have been eluding a clearer comprehension. We must address ourselves to this, somewhat neglected, aspect of Arts, and discuss the methodological issues involved in artistic performances.

Contrary to popular belief, art is also methodical. If it were to be just an emotive outburst, then there could be no art schools. True, creative level, here too, that elusive quality called institution does play a prominent part, as in mathematics. However, since clarity is a prerequisite for communication, the need for rigour cannot be ignored. Every performer, whatever be the media - be it dance, drama, music or painting - has the intention of communicating something. Hence there must be clarity as to what, to whom, how and why something is being communicated. Then alone can there be usefulness, though sheer entertainment is also

one such purpose. This would mean, in practice, a two-level integration in the mind of the artist. One is, communication of the performer with himself so that he *knows* what he is communicating and, two, he knows that he *is* communicating.

Another ticklish issue involved in pedagogic programmes is to evaluate and rank art performances. How can confusion be adjudged, communicated or taught? Apart from the clarity we also need a criterion – a measuring rod or a scale to adjudge. In the absence of such a yard-stick, any judgement about artistic performances would be merely an expression of likes or dislikes, which may have an internal reasoning but is not articulate. Nevertheless, such inarticulatable criteria cannot be used as a means of discussion or conviction. Thus, to train artists and to teach them the techniques of evaluating artistic performances we require a clear-cut relationship between the what, the why and the how of art. And such a relationship can be defined only in terms of what the mathematicians call a correspondence. What is of great importance is to make sure that the set of weights defined by this correspondence is a relevant one. Such tying together of the three distinct aspects of performing art – the what, the how and the why of a given presentation yields a structure thus structuralisation becomes a necessity, first at the level of the artist's own understanding, then, at the level of obtaining a measuring rod for evaluation, and, finally, at the level of external communication using the various audio-

visual aids. Further, as each component of the structure is also a structure no art work is complete until the three structures obtained at the various levels themselves are integrated into a grand design. Such structures may be defined mathematically in terms of points in a metric space.

A question may be raised as to the empirical feasibility of translating such an abstract, mathematical notion in actual practice. Although the methodology suggested here is apparently formal and far removed from art, it is, in fact, eminently suited for performing arts. Drama, for instance, being a composite form of art, is naturally structural in terms of the play content or the theme. It is also true of music. Every specific presentation such as they playing or singing, say, of, a *Sudha Gandhara*, would be a well-defined structure in terms of given scale and intensity. The author's own experience, especially in the field of drama, at adopting such a scientific attitude has been highly satisfactory. Over time, the pupils trained along this school have also found the approach not only practical but also aesthetically richly rewarding.

A structural entity contains within itself implicitly, a sense of beauty – a structural sense of aesthetics. And the realisation of this sense of aesthetics provides wide scope for experimentation, so that we could raise art far above mere entertainment and use it to interpret and portray the multi-faceted experiences of life.

CHAPTER IV

Concluding Observation

The ubiquitous nature of the structuralist method as extracted from the contributions of the Haridasarus is far from exhausted. as can be seen from the earlier chapter. Since this framework is useful and based on facts, it follows that following other methods could well lead to a waste of research effort for the main reason, viz, that lack of empirical relevance. The opportunities for analytical and empirical explorations are aplenty when one adopts the vecorial view and uses the resulting structuralist method. In the works of the Haridasarus, we see them using several geometric concepts of which the square and the circle were quite prominent. But one has to be chary while understanding these tools where others have used them albeit in different context. The following examples illustrate this point:

i) One of the tools or approaches generally used traditionally is using the cycle or a circle - having neither a beginning nor an end - as a model for interpreting the movement of bodies in astronomy, or the repetitive natural process of the seasons. However, not all phenomena give the overwhelming impression of circularity as, for example, history

which is linear'. The dangers in accepting an unthought of scheme as a framework would lead to dangerous contradictions, such as concepts which are essentially changeless, repetitive and static and progress as being illusory.! This would lead to the logical pitfall regarding change as being imperfect, and disproportionate and, therefore, logically incapable of comprehension.

ii) As a second example, the value system used by the Haridasarus while understanding animates could well lead to impression that they supported inequalities. The individual life history of the Haridasarus, as well as their contribution to the social ethos of their times, however completely belies this impression. Equality and inequality are widely used concepts in philosophical debate and ideological writings. They are not absolute or opposing concepts. Paradoxical as it may sound, the attainment of absolute equality implies unequal treatment for different individuals, because they are initially endowed with different needs and abilities. While examining the criteria for judging inequalities, some view several aspects such as need, merit, natural ability, and public welfare.

Rawls demonstrates that the utilitarian justification of inequality is not fair. The test of justice as

1 Though, in an abstract sense, time is linear because it does not repeat itself, it is also circular because there is no beginning or end, as in the repetition of the same form in terms of minutes, seconds, etc.

fairness is what would be (mutually) acceptable to individuals. The political orientation of Rousseau or Marx as regards equality, is again quite different from equality as a philosophical concept. What underlies both philosophical reasoning and political attitude however, is their common concern to remove inequalities.

Inequalities based on equal opportunities are not inimical to the maintenance of status and hierarchy as the major principles of social structure. Although some inequalities of a biological or functional value are not ineradicable, we still find the persistence of unequal class status and power in societies.²

iii) The steady-state system is typically scientific in the sense of following a methodological principle of uniformity in the primary (physical) as well as in the secondary (geological) causes. However much aesthetic and religious aspects are present in nature, scientific methodology today does not admit them, though they may influence scientific beliefs. Hence those who observed catastrophes could not reconcile uniformity with events. The principle of actualism holds that physical and chemical processes are elementarily the same always, along with complicated geological phenomena like erosion sedimentation, etc. These combinations are repeatable—in fact they are

2 Andrew Blower and Cavallance Thompson (Ed) Inequalities, Conflict and Change, Open University Press, 1976.

often repeated so that it 'de-historicizes' the catastrophe theory. Both uniformitarianism and non-uniformitarianism theories adopt the actualistic method which tries to explain, through present and existing processes, past events and phenomena. In fact, every event in natural history has physical and historical, and therefore, repeatable and unrepeatable aspects. In the intellect and will of humans, however, there is no repeatable event which makes them uniform, but the Haridasarus, by following a series of rigid logical processes in their thinking, arrived at a framework which was not a fortuitous turn or an accidental coincidence but a certain phenomenon knit together consciously. It is true that the development of society over ages moves by small steps, rather than by large shocks. Hence the Haridasarus could not be expected to have an influence which would radically change society but would imperceptibly and surely do so in order that future oscillations would be limited to minor ones around a stable average state. Social development cannot be moulded by single individuals. However the scientific aspect of actuality and uniformity in terms of the elements (here concepts) repeat themselves in the same combinations. The repetitiveness is even more true of the inner thoughts motivating the Haridasarus to play their role in society. Their history does not deal only with the events they underwent but their particular committed way of thinking which they as independent persons, as also as part of a collective movement continued so that their history is qualitatively

different from that of other men - a new generation of people who are a continuation of their older predecessors but different from other humans. Their scientific knowledge bears an accumulative character where a deliberate and conscious process of delivery is involved in handing over the experience and knowledge of former generations to the next one in the intellectual sense. This was also accompanied by the ethical attainment of the individuals. The quality of their thought can be judged by the aesthetic standards they set themselves in their art which is admired by many modern people even today, so that they are said to have contributed not only to ethical insight and aesthetic creativity but also to scientific knowledge. The structure and meaning is full of natural belief and a vitalistic view which does not pose men as superior to nature but as an integral part of nature. The tools they developed, being scientific, were leading towards greater differentiation, yet these tools had efficiency. An unerring principle lies behind the vivid picture which is embraced in their thought action. The causal relation between subsequent generations of Haridasarus unfolds in terms of a lineal descent through the ages, wherein lies the uniformity in their cultural development, guided by a natural logic. The categories of logic and concepts they used are as much a part of the twentieth century culture as they were objectively relevant during their own times. This is so because rituals, incantations and primitive type-sacrifices were not only not relevant for their intentions but not

even accessories for their ideological expressions. Thus, they were outstanding personalities but not authoritarian individuals in any sense, though they had personal and unique characters. Just as we do not become a blade of grass to try to understand its history, so also their real thoughts and processes can be analysed and understood in a scientific way. The most important point to be grasped is that their methods are different and that they must not be confused with others who might have applied them, without understanding them, *i.e.*, superficially with differing conclusions. Thus it is that their uniformity is not a steady state without motion or progress, but a uniformity of process, a methodological approach and a system of thought. Their fundamental attitudes are unaltered and each is consciously influenced by the knowledge of the past, so that it is all integrated into a structure. They were highly skilled as minute observers of structures and were essentially persuasive teachers. They did not have a (marked) tendency to pontificate and hence secured a larger following, as their area of influence was greater than a mere select following of intimates. The underlying similarity of emphasis was studied and uniform and not just an erratic flash of enlightenment. They dealt with physical sciences which were not exempt from the integrative influence of their comprehensive attitudes as as mathematicians and scientists. They were thus different from their non-mathematical contemporaries who used inaccurate phrases and suppositions which contrasted unfavourably with

the wholesome assurances, of the former. They were unique in being incorrigibly rigid and at the same time, working for, and identifying themselves strongly with a religion-science alliance through a method.

Thus the theme recurs, again and again, of a western scene, where the incentive for scientific research was diverted from religious teaching. and the tradition of the Haridasarus, where the compulsion to look at life to the exclusion of other extraneous considerations through a scientific system has characterised it over the centuries. As in the former, there was no crude and naive obscurantism in invoking the scriptures ; on the contrary, it acted as the mainspring for scientific belief and a social purpose of scientific enquiry. It is in this interaction of sciences and scripture that the importance of the Haridasa movement must be realised.

This monograph does not wish to prove pretensions that are beyond its purpose, nor does it intend merely to provoke scholars, but it does claim to have the scholarly aim of discussing issues from every worthwhile point of examination so that the conclusions cannot be discussed as mere claims.

A unique argument for strictly coordinating science and religion is that, one, equally as much as the other, frees man from dogmatism and superstition. As Planck says ; "Religion and natural science are fighting a joint battle in an incessant, never relaxing crusade against

septicism and against dogmatism, against disbelief and against superstition, and the rallying cry in this crusade has always been, and always will be, "on to God".²

² Max Planck : Scientific Autobiography and other Papers.
Pg. 187.

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ERRATA

<i>Page No.</i>	<i>Line No.</i>		<i>Incorrect</i>	<i>correct</i>
	<i>from Top</i>	<i>from Bottom</i>		
1	2	3	4	5
Inside cover			study of	study of the
"			Ranganatha	Ranganath
Contents		3	NTRODUC- TION	INTRODUC TION
"		2	Nunciation	Enunciation
7		7	mataphors	metaphors
11		last line	missing	(The idea of perpetual har- mony projected to every)
12	5		layer a	layer to a
15	3		regin	reign
20	1		die	did
20	2		werd	were
21	4		methemathical	mathematical
29	14		sanskrit	Sanskrit
29	13		education	education
41	6		Social	Social
42	17		the form or	the form of
48		2	Anvbhaua	Anubhava
49		8	youngsteres	youngsters
50	11		legitimate	legitimise
56	12		sanskrit	Sanskrit

1	2	3	4	5
57	8		will it be	will He be
61	10		Madhavacharya	Madhvacharya
63		10	grew,	grew.
66		3	on statement	on a statement
66		last line	asses s	assess
67	5		Surrounde	Surround
67	5		asumption	assumption
69	12		cotextual	contextual
71	15		absolutates	absolutes
76	10		New cocepts	New concepts
76	14		implicity	Implicitly
80		4	my be equal	may be equal
81		7	structualism	structuralism
82	8		sencse	sense
82	16		nasmuchas	in as much as
83	18		embedded it	embedded in it
85	5		a ¹	a ₁
85	10		Can	Can
87	4		of'	of
87	12		to the abstract	in the abstract,
				in terms
87		2	individuals.	individuals'
88	11		existing	"existing
89	4		eating ;	eating :
91	2		analysis	analysis,
91	6		Tools	Tool .
92	9		ineffetiveness	ineffectiveness
94	1		resultant o	resultant of
94	14		calls	cells
94	19		entitles	entities
94		2	Socia	social

1	2	3	4	5
95	10		Statistics ⁷	Statistics ¹⁷
95	11		Satistics	Statistics
95	16		relation	a relation
95	18		variables	variables ;
95	18		exist ;	exist,
96	15		bases	basis
96		Footnote	Mendlik	Mandlik
98	4		claims	claim
98		2	Pick.	Pick
103		6	control	control of
107	3		discevered	discovered
107	8		lles	lines
107		9	more than	more then
108	5		thories	theories
108	9		Psychology	Psychology
108	Footnote	1st line	Sraff's contri- bution	Sraffa's contri- bution
108	Footnote	5th	Contravery	Contraversy
109		7	inierval	interval
109		6	that data	that date
110	11		influencing an	influencing and
112		7	constitutton	constitution
113		3	rather then	rather than
114	12		wiih	with
114	6		art-are	art are
114		last	ndia	India
114		last	passage of	passage
114		11	there	three
115	7		has been	has been a
115		9	Institution	intuition
115		10	creative	at the creative

1	2	3	4	5
116	10		measurling	measuring
116	14		Nevertheless	Nevertheless
116	22		importantance	importance
116		5	presentation	presentation-
116		5	structure thus	structure. Thus
117	8		Mathemstical	Mathematical
117	12		Porforming	Performing
117	13		from	form
117	15		hey	the
117	16		Sudha	Suddha
117	17		of given	of the given
117		4	provides	provides
118	Title		Observation	Observations
118	7		viz, that lack	viz, lack
118	9		vecorial	vectorial
118	15		in different	in a different
119	11		lead to	lead to an
119	18		sounds	sound
119	18		obsolute	absolute
120		Foot note	Inequalities	Inequalities
				Conflict and
				Change
121	5		rnd	and
122	16		natural	natural
122		10	thought	thought and
123	4		attitudes as as	attitudes as
124		6	discussed	dismissed

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